CHAPTER 3

ALTERNATIVES

3.1 INTRODUCTION

This chapter describes the alternatives screening process that the Federal Aviation Administration (FAA) used to identify a range of reasonable and feasible alternatives that meet the Purpose and Need of the Proposed Action. As described in **Chapter 2**, there are five groups of projects in the Proposed Action with specific needs identified for each project group. The alternatives discussed in this chapter are designed to address each set of needs. **Appendix C** contains background material and detailed analysis that supplements the material contained in this chapter.

This section provides additional context related to the specific guidance on alternatives analysis as prescribed under Council on Environmental Quality (CEQ) regulations. **Appendix C,** Section C.1.1 provides additional detail on regulatory context.

As described in **Appendix C,** Section C.1.1.3, the assessment of impacts to environmental resources is conducted according to a regulatory context that requires consideration of special purpose environmental laws with requirements relative to the consideration of alternatives. FAA Order 5050.4B Section 9.t. states, "Special purpose laws cover a range of Federal laws, regulations, executive orders, and departmental orders that are outside NEPA." National Environmental Policy Act (NEPA) analysis and documentation requires coordination and integration with analysis and findings to be made under special purpose laws. As alternatives were being considered for this Environmental Assessment (EA), it was evident that some components of the Proposed Action could affect resources protected by the following special purpose laws that have requirements relative to alternatives:

- United States Department of Transportation (DOT) Act, Section 4(f),
- Section 106 of the National Historic Preservation Act,
- Clean Water Act (CWA), Section 404(b)(1), and
- Executive Order 11988, Floodplain Management and DOT Order 5650.2, Floodplain Management and Protection.

The Section 4(f) assessment for the Proposed Action is documented in **Appendix H** of this EA.

3.2 OVERVIEW OF THE ALTERNATIVES SCREENING PROCESS

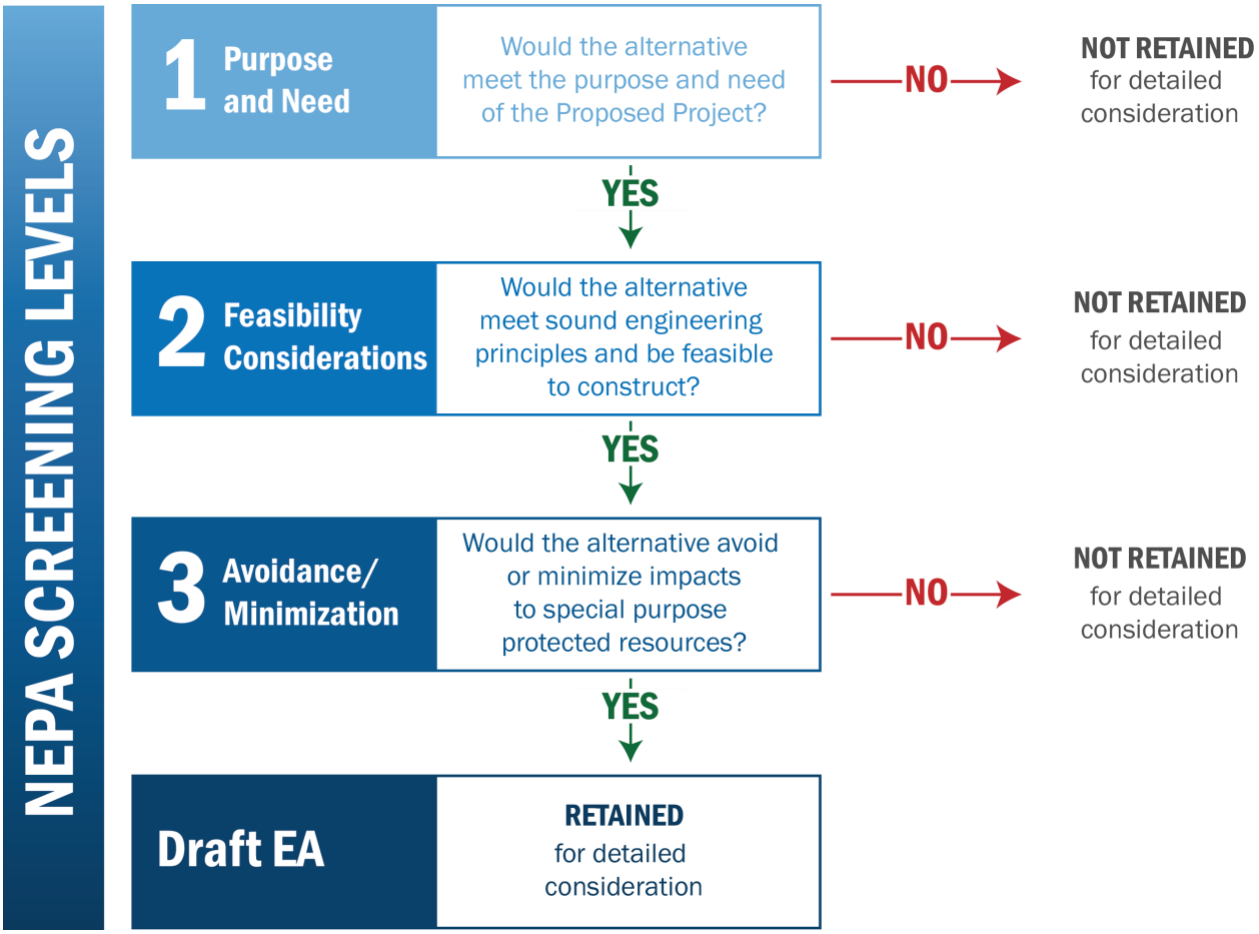
The alternatives evaluation for this EA followed a three-step process, reflecting CEQ, FAA, and special purpose law considerations, as depicted in **Figure 3-1**. The FAA applied the same systematic screening process to all five groups of projects in the Proposed Action, although the process was modified to accommodate the specific project needs of each group. Screening Step 1 addressed whether the alternatives would satisfy the purpose and need for each group of projects. The needs identified in **Chapter 2,** reflect a broad range of problems; therefore, a broad range of potential alternatives were considered to meet these

needs. Screening criteria varied by project group and were based on the specific needs identified; a more detailed discussion concerning screening criteria for each group is included in **Appendix C,** Section C.2.

Screening Step 2 was used to determine if an alternative was feasible. Feasibility is defined in the negative by FAA guidance (1050.1F Section Appendix B-2.3): "an alternative is not feasible if it cannot be built as a matter of sound engineering judgement." Under this step, alternatives were screened to ensure that they meet sound engineering and constructability principles. Analysis conducted in Step 3 evaluated the extent to which the alternative would avoid or minimize impacts to special purpose protected resources, as noted in **Section 3.4.1.5**.

Alternatives that did not meet criteria established in any one of the preceding steps were not carried forward for further assessment; for example, alternatives that did not meet Step 1 (purpose and need) criteria were not assessed in Step 2 (feasibility) of the screening process, and alternatives that did not meet Step 2 criteria were not assessed in Step 3 (avoidance/minimization). Additionally, alternatives that were not retained through this screening process were not subject to a detailed analysis of environmental consequences, as described in **Chapter 5**.

FIGURE 3-1
ALTERNATIVES SCREENING PROCESS



Source: HMMH, 2021

3.3 SUMMARY OF ALTERNATIVES CONCLUSIONS

A range of alternatives was developed for Group 1 and Group 5 project groups. Groups 2, 3, and 4 are not anticipated to cause significant environmental consequences or unresolved conflicts, resulting in consideration of two alternatives: Proposed Action Alternative and No Action Alternative.

As detailed in **Section 3.4**, only one Group 1 alternative satisfied Steps 1 and 2. During Step 3, it was shown that this alternative would cause impacts to resources protected under special purpose environmental laws and regulations, principally impacts to historic resources considered within Section 4(f) resources. During Step 3, it was shown that there are no prudent and feasible alternatives that would avoid the on-airport Section 4(f) resources. The FAA then considered variations to the alternative that would minimize impacts to the 4(f) resources and avoid adverse effects. Numerous variations were identified as lessening the effects, but only one variant was found to avoid an adverse effect. After the alternatives screening process, the Chicago Department of Aviation (CDA) incorporated the variant to the O'Hare Global Terminal (OGT)/Concourse B, Rotunda, and Concourse C/Satellite 1 as components of the Proposed Action. Two alternatives were carried forward for detailed consideration of environmental consequences in this EA. The two alternatives are CDA's Final Proposed Action and the No Action, which are described in detail in **Appendix C**, Section C.2 and summarized in **Section 3.9**.

Sections 3.4 through **3.9** present alternatives considered for each group of projects, including identification of alternatives carried forward for detailed environmental analysis. Alternatives were considered for each project group separately to ensure that the widest range of options were reviewed.

3.4 GROUP 1 ALTERNATIVES CONSIDERED – TERMINAL PROJECTS

Group 1 Terminal Projects includes the following specific projects:

- O'Hare Global Terminal and Concourse,
- Satellite Concourses 1 and 2,
- Terminal 1 Concourse B northeast end expansion,
- Terminal 1 Concourse C expansion,
- Terminal 3 Concourse L stinger one-gate addition,
- A consolidated tunnel for handling baggage, pedestrians, and utilities,
- Terminal 5 curbside and roadway improvements,
- Taxiway replacements, and
- Temporary projects.

A broad range of potential alternatives were considered to meet the needs of Group 1 (described in detail in **Chapter 2**), that include:

- Provide updated terminal facilities to address those that have reached the end of their design life,
- Provide facilities that meet modern passenger needs,
- Facilitate domestic and international airline partner operations to ensure that passengers, luggage, and aircraft can transition between the two types of travel,
- Provide sufficient gate frontage and availability, gate flexibility, and taxiway connections to efficiently accommodate aircraft fleet mix, and
- Provide adequately sized curbside facilities and ground access to Terminal 5.

3.4.1 Identification of Group 1 Alternatives

As part of this EA, the FAA took a comprehensive approach to Group 1 alternatives development as described in the following section.

3.4.1.1 Range of Group 1 Alternatives Considered

Table 3-1 provides a list of the fourteen alternatives considered for Group 1. Each alternative was assigned an Alternative Identification (ID) number to assist in tracking them throughout the analysis presented in this document. Each alternative is summarized in the sections that follow.

TABLE 3-1
RANGE OF ALTERNATIVES CONSIDERED

Location	Group	Alternative ID	Alternative
Off-Airport	Use of Other Modes of Travel or Communication	1a	Conventional and High-Speed Rail Alternative
Off-Airport	Use of Other Modes of Travel or Communication	1b	Highway Travel Alternative
Off-Airport	Use of Other Modes of Travel or Communication	1c	Communications Alternative
Off-Airport	Use of Other Airports	1d	Use of Local Airports Alternative
Off-Airport	Use of Other Airports	1e	Use of Other Mid-Continent Airports Alternative
On-Airport	North	2a	New Terminal Core (North) Development Alternative
On-Airport	North	2b	Improvement and Expansion (North-Central) Development Alternative
On-Airport	South	2c	New Terminal Core (South) Development Alternative
On-Airport	South	2d	Improvement and Expansion (South-Central) Development Alternative
On-Airport	East	2e	New Terminal Core (East) Development Alternative
On-Airport	East	2f	Improvement and Expansion (East-Central) Development Alternative
On-Airport	West	2g	O'Hare Modernization Terminal Concept Alternative
On-Airport	West	2h	New Terminal Core (West) Development Alternative
On-Airport	West	2i	Improvement and Expansion (West-Central) Development Alternative

Source: HMMH, 2021

Off-Airport Alternatives

Off-airport alternatives present alternatives to on-airport construction to address the needs identified for Group 1 projects (see **Section 2.3.1**). In effect, these alternatives might serve existing or forecast demand for commercial air service at O'Hare International Airport (O'Hare) (see **Section 1.4**) by providing alternate means or modes of travel for passengers to achieve their travel needs. Such off-airport alternatives could include use of conventional or high-speed rail, highway travel (car or bus), and alternative communication modes (i.e., teleconferencing). All off-airport alternatives are described in the sections below.

Use of Other Modes of Travel or Communication

It may be possible to alleviate the need for the Proposed Action if passengers and cargo use surface modes of transportation (car, bus, or rail) or telecommunications to achieve the purpose of their travel. Thus, alternative modes of travel or communication might provide options to accommodate some portion of the demand forecast for O'Hare. This category of alternative includes consideration of the following:

- Alternative 1a. Conventional and High-Speed Rail Alternative,
- Alternative 1b. Highway Travel Alternative, and
- Alternative 1c. Communications Alternative.

Use of Other Airports

The timing and need for terminal improvements at O'Hare might also be reduced or eliminated if operations and/or passengers used other airports. This category of alternatives included consideration of:

- Alternative 1d. Use of Local Airports Alternative and
- Alternative 1e. Use of Other Mid-Continent Airports Alternative.

On-Airport Alternatives

This section summarizes the potential O'Hare on-airport development alternatives to address the Group 1 needs. On-airport development could include alternatives to constructing facilities at the O'Hare terminal core, such as terminal development on other areas on the airport. For this EA, the FAA considered terminal development concepts that had historically been explored by the CDA as well as several new on-airport alternatives. While the CDA has identified its preferred terminal development, the FAA examined alternative locations where the facilities might be undertaken. The O'Hare on-airport development alternatives were analyzed by compass direction relative to the existing central terminal core (essentially existing Terminals 1 through 3), as shown in **Exhibit 3-1**. For each direction (north, south, east, and west), a minimum of two alternatives were considered as follows:

1. Construction of a new terminal core: These alternatives would incorporate the construction of a new terminal core in another location to meet terminal facility requirements.
2. Improvements to and expansion of the existing terminal core: These alternatives would incorporate improvements to and expansion of the existing terminal core to meet terminal facility requirements that would address the purpose and need for Group 1 projects.

Alternatives considered to the west of the existing terminal core also included a prior terminal alternative considered by the CDA in the 2005 O'Hare Modernization Program Environmental Impact Statement (OMP EIS), the O'Hare Modernization Terminal Concept Alternative. All on-airport alternatives are identified and described in the sections below and the analysis of these alternatives is documented in **Section 3.3.1.2**. The following on-airport alternatives were considered:

- Alternative 2a. New Terminal Core (North) Development Alternative,
- Alternative 2b. Improvement and Expansion (North-Central) Development Alternative,
- Alternative 2c. New Terminal Core (South) Development Alternative,
- Alternative 2d. Improvement and Expansion (South-Central) Development Alternative,
- Alternative 2e. New Terminal Core (East) Development Alternative,
- Alternative 2f. Improvement and Expansion (East-Central) Development Alternative,
- Alternative 2g. O'Hare Modernization Terminal Concept Alternative,
- Alternative 2h. New Terminal Core (West) Development Alternative, and

Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

O'Hare On-Airport Alternatives by Geographical Directions

▶ Exhibit 3-1

- Alternative 2i. Improvement and Expansion (West-Central) Development Alternative (Proposed Action).

No Action Alternative

Under the No Action Alternative, implementation of the proposed Group 1 projects would not occur. The current terminal facilities at O'Hare would remain unchanged. The No Action Alternative includes existing facilities and their associated square footage[1] and independent utility projects. As explained in **Chapter 1** and **Chapter 2**, some independent utility projects, as shown on the draft O'Hare Future Airport Layout Plan (ALP), have been or will be processed through NEPA separately from this EA. A list of these projects is provided in **Appendix C**, Section C.4, Table C-51.

As described in **Section 3.2** and **Appendix C**, **Section C.2.1.2**, the alternatives evaluation for this EA followed a systematic three-step screening process to narrow down the range of alternatives considered as illustrated in **Figure 3-1**. The alternatives were evaluated using consistent screening criteria to determine which one(s) met the Purpose and Need, are feasible to construct, and minimize or avoid impacts to special purpose law protected resources. The screening criteria are summarized in **Table 3-2** and the sections that follow. **Appendix C**, Section C.2.1.2 provides additional detail and background material.

Step 1: Purpose and Need Evaluation

Five screening criteria were used to evaluate whether each alternative meets the stated needs of the proposed action for Group 1. Those are:

- **Criterion 1:** Would the alternative address the need to provide updated terminal facilities to address those that have reached the end of their design life?
- **Criterion 2:** Would the alternative address the need to provide facilities that meet modern passenger needs?
- **Criterion 3:** Would the alternative facilitate domestic and international airline partner operations to ensure that passengers, luggage, and aircraft can transition between the two types of travel?
- **Criterion 4:** Would the alternative address the need to provide sufficient gate frontage and availability, gate flexibility, and taxiway connections to efficiently accommodate aircraft fleet mix?
- **Criterion 5:** Would the alternative address the need to provide adequately sized curbside facilities and ground access to Terminal 5?

To identify whether each alternative meets these criteria, the FAA defined criterion requirements that would need to be met for an alternative to proceed to Step 2 of the alternatives screening process.

In summary, to meet Criterion 1, each alternative must accommodate replacement or revitalization of infrastructure that has reached the end of its useful life. To determine whether each alternative met Criteria 2, 3, and 4, the FAA applied a spatial requirement analysis based on terminal facility requirements identified in **Section 2.3.1.2** to the existing airport property,[2] which is summarized below. Further detail can be found in **Appendix C**, Section C.2.1.2. To meet Criterion 5, each alternative must allow for necessary improvements to Terminal 5 roadways, including reducing the roadway congestion at Terminal 5 and enabling the efficient transfer of passengers between terminals. For Criteria 2, 3, and 4, specific terminal facility spatial requirements were calculated based on the anticipated activity level in the future planning horizon. Facility requirements show that additional space is needed to meet modern passenger needs as well as the forecast activity levels. Terminal facility requirements, as well as supporting airfield

[1] CDA. Chicago O'Hare International Airport. Terminal Area Plan Environmental Assessment. Terminal and Concourse Space – Existing, No Action Scenario, and With Project Scenario – Final Proposed Action. November 19, 2021.
[2] February 2022 Draft Future O'Hare ALP

infrastructure such as apron pavement, ramps, and taxiway connections, were translated into an estimated land envelope.

The land envelope for the No Action Alternative was based on 6,306,820 square feet of terminal facility space within the existing central terminal core (Terminal 1 through Terminal 3) and was estimated at 412 acres, including supporting airfield infrastructure such as apron pavement, ramps, and taxiway connections.[3] As noted in **Section 2.3.1.2**, alternatives must provide an additional 3,225,620 square feet of terminal facility space, requiring 134 additional acres adjacent to the existing terminal core, when compared to the No Action Alternative. Therefore, the FAA determined that a total land envelope of 546 acres is needed to meet modern passenger needs in a single, contiguous land envelope, an increase of approximately 50 percent over the No Action Alternative.

Two terminal envelopes were identified by the CDA for the area required to enable airline codeshare partners[4] to occupy a shared terminal at O'Hare. Codeshare agreements are supported by the two airlines that dominate activity at O'Hare: Oneworld (American Airlines and its partners) and Sky Team (United Airlines and its partners). Three or more terminal complexes would lead to separation of airline facilities, which would not only require that international passengers connect between multiple terminals but also result in the need for duplicate staffing for airlines, inefficient baggage processing, and longer gate occupancy times for aircraft (see **Section 2.3.1.3**). If development were to take place in two separate land envelopes (i.e., the existing central terminal core and a separate, non-adjacent plot of land), the spatial requirement of the additional land envelope would increase to 224 acres as the separate terminal complex would need to fully accommodate one of the main airline codeshare agreements (see **Appendix C**, Section C.2.1.2 discussion under Criterion 3).

Recognizing the spatial constraints of land at O'Hare and the business relationships of the airlines, the following options were explored:

- A new terminal core to replace the existing terminal core, requiring a total land envelope of 546 acres,
- Necessary improvements to the existing terminal core and expansion of terminal facilities within a non-adjacent land envelope of 224 acres to accommodate codeshare agreements, and
- Necessary improvements to the existing terminal core and expansion of terminal facilities within an adjacent, contiguous land envelope of 134 acres.

[3] No Action includes existing space (as of April 2020) and independent utility projects that will provide additional space in the future.
[4] Codeshares are business agreements between groups of airlines, as further explained in Section 2.3.1.3.

TABLE 3-2
ALTERNATIVES SCREENING PROCESS CRITERIA

Step	Criteria		Requirements	
1 – Purpose and Need	1	Would the alternative address the need to provide updated terminal facilities to address those that have reached end of their design life?	1A	The alternative must accommodate replacement or revitalization of infrastructure that has reached the end of its useful life.
	2	Would the alternative address the need to provide facilities that meet modern passenger needs?	2	The alternative development location must have land available for development that accommodates addressing the need for: additional security screening checkpoints and infrastructure space, accessible and inclusive facilities and services, passenger amenities and concessions, enhanced passenger circulation and wayfinding, enlarged passenger waiting areas and gate frontage, incorporation of evolving technology to enhance the customer experience, and improved baggage circulation and goods storage and circulation. The spatial requirements to address this need could be met in one of three ways: 1. A new terminal core to replace the existing terminal core, requiring a total land envelope of 546 acres. 2. Necessary improvements to the existing terminal core and expansion of terminal facilities within a non-adjacent land envelope of 224 acres to accommodate the airlines that are a party to codeshare agreements; or 3. Necessary improvements to the existing terminal core and expansion of terminal facilities within an adjacent land envelope of 134 acres.
	3	Would the alternative address the need to facilitate domestic and international airline operations to ensure that passengers, luggage, and aircraft can transition between the two types of travel?	3	The alternative development location must have land available for development that can accommodate 253,040 square feet of additional Federal Inspection Station (FIS) space within the 9,532,440 square feet of total terminal facility space required under Criterion 2. This requires one of three options to accommodate both terminal facility requirements as well as supporting airfield infrastructure, landside access, and passenger connectivity. Those are: 1. A new terminal core to replace the existing terminal core, requiring a total land envelope of 546 acres. 2. Necessary improvements to the existing terminal core and expansion of terminal facilities within a non-adjacent land envelope of 224 acres to accommodate the airlines that are a party to codeshare agreements; or 3. Necessary improvements to the existing terminal core and expansion of terminal facilities within an adjacent land envelope of 134 acres. This is essentially the same spatial need as evaluated by Criterion 2 but addresses a separate functional need; to enhance passenger connections and enable co-location of codeshare partners.
	4	Would the alternative address the need to provide sufficient gate frontage and	4A	The alternative development location must have land available for development that can accommodate 30,990 linear feet of gate frontage, including a flexible range of 192 to 219 gates within: 1. A single land envelope of 546 acres.

Step	Criteria		Requirements	
		availability, gate flexibility, and taxiway connections to efficiently accommodate aircraft fleet mix?		2. A non-adjacent land envelope of 224 acres to accommodate the airlines that are a party to codeshare agreements; or 3. An adjacent land envelope of 134 acres.
			4B	The alternative must maximize gate collocation and minimize runway crossing and displacement of adequate existing infrastructure.
	5	Would the alternative address the need to provide adequately sized curbside facilities and ground access to Terminal 5?	5	The alternative must allow for necessary improvements to Terminal 5 roadways, including reducing the roadway congestion at Terminal 5 and enabling the efficient transfer of passengers between terminals.
2 – Feasibility	6	Could the alternative be constructed using sound engineering principles?	6A	Public information must be available to affirm the ability to construct the proposed alternative using sound engineering and building principles.
3 – Minimization	7	Would the alternative minimize and/or avoid impacts to resources protected by special purpose laws (see note)?	7A	The variant must avoid use of Section 4(f) resources if a feasible and prudent alternative exists.
			7B	If the variant would not meet requirement 7A, then the alternative selected must cause the least overall harm to Section 4(f) resources (includes all possible planning to minimize and mitigate any adverse impacts).
			7C	The variant must avoid adverse effect on Section 106 resources, if possible.
			7D	If the variant would not meet requirement 7C, then it must minimize adverse effect on Section 106 resources.
	8	Would the refined elements that avoid or minimize effects still meet the project purpose and need?	8A	The variant must provide for improvements or new facilities that address existing narrow corridor widths.
			8B	The variant must meet facility requirements for space (programmable space), gates, and gate flexibility.
			8C	The variant must enable appropriate functionality and organization of space.
			8D	The variant must accommodate sufficient wayfinding, signage, and universal design.
			8E	The variant must enable direct routing and connection of baggage system and back of house functions.
			8F	The variant must be feasible to construct and avoid impact to essential or difficult to replace functions.

Note: As noted in Chapter 5, resources protected by special purpose laws that are affected by the Proposed Action include Section 4(f) and Section 106, but not jurisdictional wetlands protected under Section 404 of the CWA.

Step 2: Feasibility

For Step 2: Feasibility, one criterion was identified:

- Criterion 6: Could the alternative be constructed using sound engineering principles?

This criterion assesses whether an alternative can be constructed using sound engineering and building principles. To meet Criterion 6, public information must be available to affirm the ability to construct the proposed alternative using sound engineering and building principles.

Step 3: Avoidance or Minimization of Impact

Following steps 1 and 2, only the Proposed Action Alternative (Alternative 2i) remained, and it was assessed in Step 3 of the alternatives screening process. The two criteria in Step 3 are intended to summarize the analyses conducted in the Section 4(f) and Section 106 special purpose law assessments of the Alternative 2i variants. Those are:

- Criterion 7. Would the alternative minimize or avoid adverse effect to resources protected by special purpose laws?
- Criterion 8. Would the refined elements that avoid adverse effects still meet the project purpose and need?

Criterion 7 was designed to evaluate the requirements under special purpose laws discussed in **Appendix C,** Section C.1.1 as to whether the use can be avoided and if not, whether the effects can be minimized.[5, 6] There were three Criterion 7 requirements: first, the variant must avoid use of special purpose law protected resources; second, if the variant would not avoid use, then it must avoid adverse effect; and third, if the variant would not avoid adverse effect, then it must minimize adverse effect. If the variant would meet requirements under Criterion 7, it was reviewed to see if it meets the Purpose and Need and feasibility considerations under Criterion 8. To assess the ability to meet the Purpose and Need, five requirements corresponding to the five needs discussed in **Chapter 2** were assessed with a sixth requirement focused on feasibility.[7]

3.4.1.2 Group 1 Projects Alternatives Evaluation

Figure 3-2 provides an overview of the results of the evaluation process, which is detailed in the sections that follow.

[5] Reference is made to the Section 106 process, as per the requirements of the NHPA Section 106, the Secretary of Interior criteria were used to identify whether the effects of a variant would be adverse.

[6] As is noted in Appendix H (DOT Section 4(f) Evaluation), the Proposed Action would use on-airport facilities that are eligible for the NRHP.

[7] Further detail about the variants assessment that occurred in the Section 106 and Section 4(f) processes can be found in Appendix G and Appendix H, respectively.

FIGURE 3-2
ALTERNATIVES EVALUATION OVERVIEW

LEGEND ● Yes ◆ No ✓ Retained ✗ Not Retained

	Criteria	Off-Airport 1a – 1c Other Modes	Off-Airport 1d – 1e Other Airports	On-Airport North 2a New Core	On-Airport North 2b Improvement & Expansion	On-Airport South 2c New Core	On-Airport South 2d Improvement & Expansion	On-Airport East 2e New Core	On-Airport East 2f Improvement & Expansion	On-Airport West 2g OMP Terminal Concept	On-Airport West 2h New Core	On-Airport West 2i Improvement & Expansion	No Action
Purpose and Need	1 Would the alternative address the need to provide updated terminal facilities that have reached the end of their design life?	◆	◆	●	●	●	●	●	●	◆	●	●	N/A
	2 Would the alternative address the need to provide facilities that meet modern passenger needs?	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	N/A
	3 Would the alternative facilitate domestic and international airline partner operations to ensure that passengers, luggage, and aircraft can transition between the two types of travel?	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	N/A
	4 Would the alternative address the need to provide sufficient gate frontage and availability, gate flexibility, and taxiway connections to efficiently accommodate aircraft fleet mix?	◆	◆	◆	◆	◆	◆	◆	◆	●	◆	●	N/A
	5 Would the alternative address the need to provide adequately sized curbside facilities and ground access to Terminal 5?	◆	◆	●	●	●	●	◆	◆	●	●	●	N/A
	Move to Step 2?	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	N/A
Feasibility	6 Could the alternative be constructed using sound engineering principles?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	●	N/A
	Move to Step 3?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	N/A
Minimization	7 Would the alternative minimize or avoid adverse effect to resources protected by special purpose laws?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	●	N/A
	8 Would the refined elements that avoid adverse effects still meet the project purpose and need?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	●	N/A
	Retained for Detailed Consideration in this EA?	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓

Source: HMMH, 2021

3.4.1.3 Step 1: Purpose and Need Evaluation

Step 1 of the alternatives evaluation process is the Purpose and Need evaluation. This section describes the results of the Step 1 evaluation which focuses on the ability of the alternatives to satisfy the purpose and need for Group 1 projects, as described in **Section 2.3.1**. Additional background material and detailed analysis can be found in **Appendix C**, Section C.2.1.2.

Off-Airport Alternatives

Use of off-airport alternatives were considered extensively in preparing the 2005 OMP EIS. The evaluation conducted for this EA uses much of the information in the EIS with appropriate updates based on changed conditions since the EIS.

Use of Other Modes of Travel or Communication

The Use of Other Modes of Travel or Communication Alternatives—Alternatives 1a, 1b, and 1c—do not meet any of the criteria established under Step 1 of screening and therefore would not meet the purpose and need for the Group 1 projects. Additionally, the investment required to attract more air passengers to rail and highway cannot be assured and would not offset the forecast demand which has generated the need for terminal improvements at O'Hare. While increased use of telecommunications might meet the needs of some air travel purposes, it would not materially reduce the level of passengers using O'Hare. While telecommunications became widely used during the 2020-22 COVID-19 pandemic, as a vaccine became available, air travel rebounded as the public wished to travel for vacations or face-to-face meetings with family and friends. Finally, increased use of surface transportation or telecommunications would not alleviate the need to modernize the terminal complex for the passengers who do travel by air.

Use of Other Airports

The Use of Other Airports Alternatives—Alternatives 1d and 1e—do not meet any of the criteria established under Step 1 of screening and therefore would not meet the purpose and need for the Group 1 projects. It is not reasonable to expect either hubbing carrier would voluntarily shift enough connecting traffic to one or more alternative mid-continent airports to avoid the need for improvements at O'Hare, and the federal government cannot mandate such a shift. Also, use of other airports would not alleviate the need to modernize facilities at O'Hare that have reached the end of their useful life and the need for improved terminal facilities for those passengers who do travel and connect via O'Hare.

The FAA concluded that the Off-Airport Alternatives would not meet the Purpose and Need screening criteria for Group 1 under Step 1 and would not advance to Step 2 of the screening analysis. No further consideration was given to Off-Airport Alternatives.

On-Airport Alternatives

The FAA analyzed existing airport property[8] to identify available area that might accommodate the Group 1 needs. The existing land use was categorized into the following:

[8] February 2022 Draft Future O'Hare ALP

- Category 1: Land used for airfield and airfield safety areas, such as the Runway Protection Zones (RPZs),[9] Runway Safety Areas (RSAs),[10] and Runway Object Free Areas (ROFAs),[11]
- Category 2: Land used for existing facilities and infrastructure (passenger terminal, cargo, maintenance, and other supporting functions),
- Category 3: Presently undeveloped land where limited development opportunities may exist to accommodate supporting facilities and infrastructure, and
- Category 4: Presently undeveloped land where development opportunities may exist to meet the purpose and need.

In keeping with airport planning principles that prioritize highest and best use of airport land, Category 1 (airfield) was considered fixed when alternative terminal concepts were considered. No material changes in the airfield would be included in a new terminal concept except taxiway improvements that would be needed to support new terminal facilities. Category 2 (existing infrastructure) was considered fixed unless it could be accommodated in presently undeveloped land (Categories 3 and 4). Category 3 represented land within the airport property but outside the boundary of existing surface transportation routes (roadway and rail). The FAA determined that Category 3 land could be used to support relocation of existing infrastructure should development occur elsewhere on the airfield that displaced existing infrastructure but could not directly accommodate terminal facilities required to meet the purpose and need.

Focus was then placed on Category 4: presently undeveloped land within the surface transportation boundary where development opportunities may exist to meet the purpose and need, and where Category 4 land is located in relation to Categories 1 and 2. This analysis informed Step 1 of the screening process for determining whether there is sufficient land available for development that would meet the purpose and need for Group 1 projects. Specifically, the land envelope would need to meet the spatial requirements noted for Criteria 2, 3, and 4. **Exhibit 3-2** shows constrained spaces and land where opportunity for development may exist to meet the Group 1 Purpose and Need.

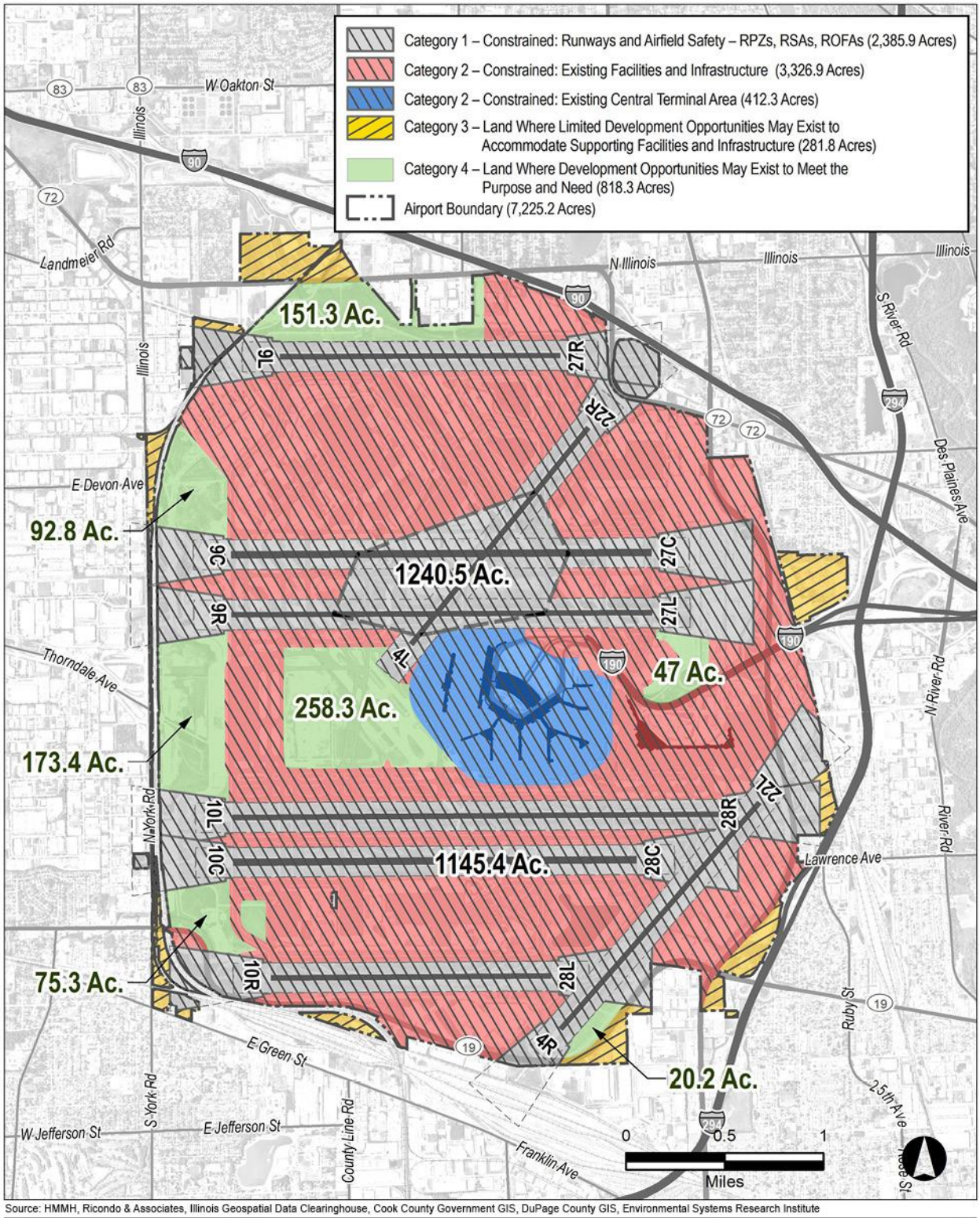
As shown in **Exhibit 3-2,** about 2,385.9 acres of land—33.0 percent of O'Hare's present 7,225.2 acres—are devoted to runways and airfield safety (Category 1) and 3,739.2 acres—51.8 percent—are devoted to existing facility space, associated infrastructure, and the existing central terminal area (Category 2). Combining these two categories resulted in 84.8 percent of the total acreage at the airport being constrained; land where development opportunities may exist to accommodate supporting facilities and infrastructure (Category 3) includes 281.8 acres—3.9 percent of the total acreage at the airport. Finally, land where development opportunities may exist to meet the purpose and need (Category 4) includes 818.3 acres—1.3 percent of total acreage at the airport.

Exhibit 3-3 highlights the land available in each geographical direction where there may be opportunities for development that meet the purpose and need for Group 1 projects.

[9] FAA AC 150/5300-13A Section 102.vvv (2012) defines RPZ as: An area at ground level prior to the threshold or beyond the runway end to enhance the safety and protection of people and property on the ground. https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5300-13A-chg1-interactive-201907.pdf

[10] FAA AC 150/5300-13A Section 102.www (2012) defines RSA as: A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5300-13A-chg1-interactive-201907.pdf

[11] FAA AC 150/5300-13A Section 309 (2012) states: The ROFA clearing standard requires clearing the ROFA of above-ground objects protruding above the nearest point of the RSA. https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5300-13A-chg1-interactive-201907.pdf



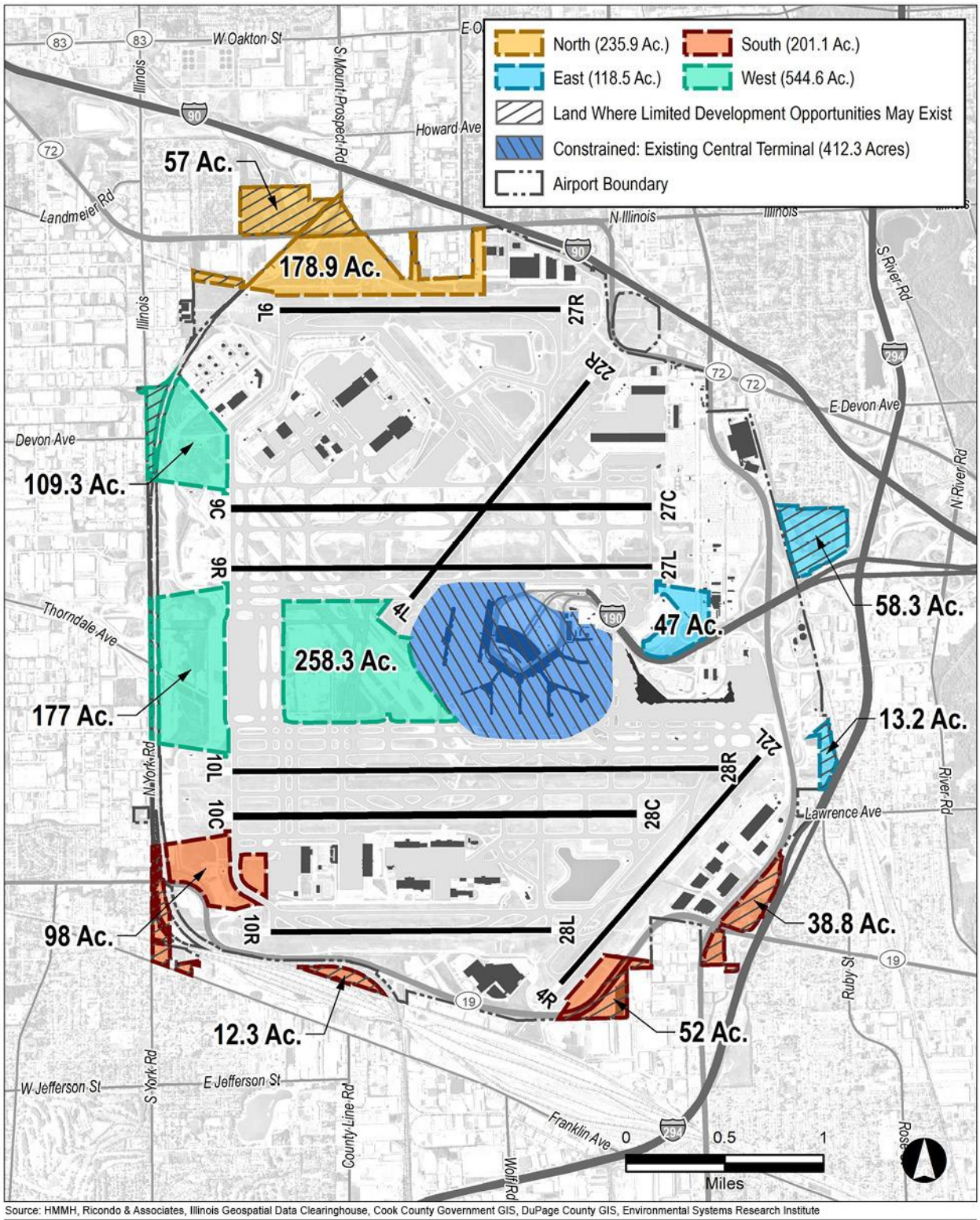
Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Constrained vs. Land Available for Development within the Airport Boundary

▶ Exhibit 3-2



Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Land Where Opportunities May Exist to Meet the Purpose and Need by Direction

▶ Exhibit 3-3

Exhibit 3-3 shows that the largest contiguous plot of land available for development is the 258.3-acre plot in the west-midfield, directly adjacent to the existing central terminal area.

As noted in **Section 3.4.1.1** under On-Airport Alternatives, the FAA considered two types of on-airport development alternatives in each development direction within the airport:

- New Terminal Core (accommodating existing Terminals 1 through 3) Development Alternatives and
- Improvement and Expansion Development Alternatives.

As noted in **Section 3.4.1.2**, when examining alternatives, three potential avenues to accommodate spatial requirements to meet the purpose and need were analyzed:

- For a new terminal core to replace the existing terminal core, available land was assessed to determine if a 546-acre land envelope could be accommodated anywhere on the airfield.
- For necessary improvements to the existing terminal core and expansion of terminal facilities:
    - **Within a land envelope non-adjacent to the existing central terminal core**, available land was assessed to determine if a 224-acre land envelope could be accommodated anywhere on the airfield, or
    - **Within a land envelope adjacent to and contiguous with the existing central terminal core,** available land was assessed to determine if a 134-acre land envelope could be accommodated directly adjacent to the existing central terminal core.

North

This category would include development alternatives where most of the new development would occur to the north of the existing terminal core. It would not preclude incorporating significant but lesser development in any other direction from the existing terminal core. Two alternatives were considered to the north of the existing central terminal core:

- Alternative 2a. New Terminal Core (North) Development Alternative and
- Alternative 2b. Improvement and Expansion (North-Central) Development Alternative.

The FAA determined that Alternative 2a could meet requirements to address Criteria 1 and 5 as it would replace infrastructure that has reached the end of its useful life through the construction of a new terminal core and accommodate improvements to Terminal 5 roadways. However, it would not meet requirements of Criteria 2, 3, or 4A as construction of a new terminal core to the north of the existing terminal core would require 546 acres of contiguous acreage available for development; as shown on **Exhibit 3-3**, there is no such plot of land available for development.

This alternative would also fail to meet Criterion 4B as development would not minimize replacement of adequate existing infrastructure relative to the other alternatives considered. Replacing all existing facilities would require decommissioning all or portions of existing Terminals 1 through 3. It would also create surface access challenges as the new terminal core would not utilize existing parking infrastructure, or surface connections, and these facilities would need to be developed at the new site. Construction of a new terminal core to the north of the existing terminal core would require the displacement and relocation of 880 acres of existing facilities not including the runways and taxiways, which could not be accommodated elsewhere on the airport; essentially this development would likely be replaced in the vacated existing terminal core. Therefore, this alternative would not minimize replacement of adequate existing infrastructure relative to the other alternatives considered. As a result, the FAA determined that this alternative does not meet the criteria established in Criterion 4B and did not retain it for further consideration.

The FAA determined that Alternative 2b could meet requirements to address Criteria 1 and 5 as it would replace infrastructure that has reached the end of its useful life through the construction of a new terminal core and accommodate improvements to Terminal 5 roadways. However, it would not meet requirements of Criteria 2, 3, or 4 as there is no land available for development immediately adjacent to the existing central terminal core to the north and this area is occupied by Runways 9R/27L and 4L/22R and their associated airfield taxiways. Development of this alternative would require either the displacement and relocation of Runways 9R/27L and 4L/22R and their associated infrastructure or significant tunneling and/or runway crossing. Therefore, this alternative would not meet criterion 4B since it would not minimize replacement of adequate existing infrastructure nor runway crossing relative to the other alternatives considered.

This alternative also considered development in the 179-acre plot available on the northern perimeter of the airport boundary (see **Exhibit 3-3**). This plot could not accommodate spatial needs associated with enabling airline codeshare partners to occupy a shared terminal, as this would require a minimum of 224 acres. Therefore, this alternative would not meet Criteria 2, 3, or 4A. In addition, if terminal complex development were to occur in this plot, it would not meet Criterion 4B. Given the existing runway configuration at O'Hare and the insufficient gate flexibility to accommodate all aircraft, development in this area would result in one of two outcomes:

- It would limit the aircraft types able to utilize the new northern terminal expansion because the length of Runway 9L/27R (7,500 feet) cannot safely accommodate departure or landing operations of larger passenger and cargo aircraft that require a runway length greater than 7,500 feet, or
- It would require larger passenger and cargo aircraft that require a runway length greater than 7,500 feet to cross runway(s) to ensure safe departure or landing from Runways 9C/27C and 10C/28C.

Therefore, development of this alternative on the northern perimeter of the airport boundary would not address the spatial needs of Criteria 2, 3, or 4A and, regarding Criterion 4B, it would either significantly limit gate flexibility, a stated need of the Proposed Action, or it would not minimize runway crossing relative to the other alternatives considered.

As a result, FAA determined that the On-Airport – North Alternatives would not meet the purpose and need of the Group 1 projects and were therefore not retained in Step 2 of the alternatives assessment for this EA. No further consideration was given to On-Airport – North Alternatives.

South

This category would include development alternatives where most of the new development would occur to the south of the existing terminal core. It would not preclude incorporating significant but lesser development in any other direction from the existing terminal core. Two alternatives were considered to the south of the existing central terminal core:

- Alternative 2c. New Terminal Core (South) Development Alternative and
- Alternative 2d. Improvement and Expansion (South-Central) Development Alternative

For the same reasons described above regarding Alternative 2a, the FAA determined that Alternative 2c could meet requirements to address Criteria 1 and 5 as it would replace infrastructure that has reached the end of its useful life through the construction of a new terminal core and accommodate improvements to Terminal 5 roadways. However, it would not meet requirements of Criteria 2, 3, or 4A as construction of a new terminal core to the south of the existing terminal core would require 546 acres of contiguous acreage available for development. As shown on **Exhibit 3-3**, there is no such plot of land available for development. In addition, this alternative would also fail to meet Criterion 4B for the same reasons as

Alternative 2a**.** Development would not minimize replacement of adequate existing infrastructure relative to the other alternatives considered as it would require displacement and relocation of existing infrastructure—726 acres of facilities, not including the runways.

For the same reasons as those described above regarding Alternative 2b, the FAA determined that Alternative 2d could meet requirements to address Criteria 1 and 5 but would not meet requirements of Criteria 2, 3, or 4 as there is no land available for development immediately adjacent to the existing central terminal core to the south. In addition, this alternative would not meet Criterion 4B because development would require either the displacement and relocation of Runways 10/28C and 10R/28L or significant tunneling to enable passenger connections between terminals and/or crossing over runways. Therefore, this alternative would not minimize replacement of adequate existing infrastructure nor runway crossing relative to the other alternatives considered.

As a result, the FAA determined that the On-Airport – South Alternatives would not meet the purpose and need of the Group 1 projects and were therefore not retained in Step 2 for further consideration.

East

This category would include development alternatives where most of the new development would occur to the east of the existing terminal core. It would not preclude incorporating significant but lesser development in any other direction from the existing terminal core. Two alternatives were considered to the east of the existing central terminal core:

- Alternative 2e. New Terminal Core (East) Development Alternative and
- Alternative 2f. Improvement and Expansion (East-Central) Development Alternative.

For Alternative 2e, construction of a new terminal core to the east of the existing central terminal core would occur in the area overlapping Terminal 5 and the primary airport entrance access corridor immediately adjacent to the existing central terminal core. Vehicles would continue to approach the terminal curbsides through the I-190 corridor, but the entrance would be shifted further east and north to accommodate the relocated terminal core. This alternative could meet requirements to address Criterion 1 as it would replace infrastructure that has reached the end of its useful life through the construction of a new terminal core. However, it would not meet requirements of Criterion 2, 3 or 4A as construction of a new terminal core to the east of the existing terminal core would require 546 acres of contiguous acreage available for development. There is no such plot of land available for development. Alternative 2e would also fail to meet Criterion 4B as development would not minimize replacement of adequate existing infrastructure relative to the other alternatives considered. It would also create surface access challenges as the new terminal core would not utilize existing parking infrastructure, or surface connections which would need to be replaced at a new terminal core site. Lastly, development in this area would also preclude it from meeting requirements for Criterion 5 as it would displace Terminal 5 and associated roadways and therefore would not allow for improvements to occur.

For the same reasons as those described above regarding Alternative 2b and 2d, the FAA determined that Alternative 2f could meet requirements to address Criteria 1 but would not meet requirements of Criteria 2, 3, or 4A as there is no land available for development to the east of the existing central terminal core. Currently, the eastern terminal airfield is occupied by two airfield taxiways, the I-90 access corridor, and Terminal 5 that would need to be displaced and relocated for this alternative to be developed. Therefore, this alternative would not minimize replacement of adequate existing infrastructure relative to the other alternatives considered. Development in this area would also preclude it from meeting requirements for Criterion 5 as it would displace Terminal 5 and associated roadways and therefore would not allow for improvements to occur.

As a result, the FAA determined that the On-Airport – East Alternatives would not meet the purpose and need of the Group 1 projects and were therefore not retained in Step 2 of the alternatives assessment for this EA. No further consideration was given to On-Airport – East Alternatives.

West

This category would include development alternatives where most of the new development occurs to the west of the existing terminal core. It would not preclude incorporating significant but lesser development in any other direction from the existing terminal core.

The CDA has previously explored and proposed development alternatives to the west of the existing central terminal core. One such terminal development concept, the O'Hare Modernization Terminal Concept Alternative developed as part of the 2004 Master Plan for O'Hare, was analyzed as part of the alternatives assessment for this EA. As a result, three alternatives were considered to the west of the existing central terminal core:

- Alternative 2g. O'Hare Modernization Terminal Concept,
- Alternative 2h. New Terminal Core (West) Development Alternative, and
- Alternative 2i. Improvement and Expansion (West-Central) Development Alternative.

The FAA determined that Alternative 2g would not meet the requirement of Criterion 1 as it would rely heavily on use of existing Terminals 1, 2, and 3 in addition to the new terminal facilities. Only minor upgrades were envisioned to Terminal 2, and none to Terminals 1 or 3, other than the needed modernization of these facilities. The new western facilities would be modern, but no other improvements to modernize the existing central core terminal complex would occur.

Alternative 2g could meet the spatial requirements of Criteria 2, 3, and 4. However, this alternative would not meet all requirements for Criteria 2 and 3. While new western facilities would be developed, the needs associated with the existing central core facilities would not be addressed—namely, narrow corridor widths, inadequate passenger amenities, and inadequate baggage circulation—would remain. In addition, based upon having three activity centers, airlines would be more distributed and distanced, further inhibiting passenger connections. Alternative 2g could meet all requirements of Criteria 4 and 5, as improvements outlined in the O'Hare Modernization Terminal Concept Alternative would provide a total of 232 gates and approximately 38,460 linear feet of total gate frontage. This would exceed the 30,990 linear feet of gate frontage and range of 192 to 219 gates required to meet the Purpose and Need. Also, required improvements to Terminal 5 roadways could be accommodated in relation to Criterion 5. In conclusion, the FAA determined that Alternative 2g does not meet all the criteria established in Step 1 and did not retain it for further consideration.

For the same reasons described above regarding Alternatives 2a and 2c, the FAA determined that Alternative 2h could meet the requirements to address Criteria 1 and 5 as it would replace infrastructure that has reached the end of its useful life through the construction of a new terminal core and accommodate improvements to Terminal 5 roadways. However, it would not meet the requirements of Criteria 2, 3, or 4A as construction of a new terminal core to the west of the existing terminal core would require 546 acres of contiguous acreage available for development. As shown on **Exhibit 3-3**, there is no such plot of land available for development. In addition, this alternative would also fail to meet Criterion 4B for the same reasons as Alternatives 2a and 2c**.** Development would not minimize replacement of adequate existing infrastructure relative to the other alternatives considered as it would require displacement and relocation of existing infrastructure. It would also create surface access challenges as the new terminal core would not utilize existing parking infrastructure, or surface connections. Also, demolition of the existing terminal core

would be required to enable a roadway connection, resulting in loss of existing adequate infrastructure that does not necessarily need replacement.

In conclusion, the FAA determined that Alternative 2h does not meet the criteria established in Step 1 and did not retain it for further consideration.

Alternative 2i would consider improvement and expansion in land available for development to the west of the existing central terminal core. Two plots of land are available for development to the west of the existing central terminal core—the 177-acre plot on the western perimeter of the airfield and the 258.3-acre plot in the west midfield (see **Exhibit 3-4**).

Development in the 177-acre plot available on the western perimeter of the airport boundary could meet the requirements to address Criteria 1 and 5 for the same reasons described above regarding Alternatives 2b and 2d. However, it could not accommodate spatial needs associated with enabling airline codeshare partners to occupy a shared terminal, as this would require a minimum of 224 acres. Therefore, this alternative would not meet Criteria 2, 3, or 4A. Development in this plot would not meet all requirements for Criterion 3 as it would limit the ability to enhance passenger connections and enable co-location of codeshare partners. Therefore, FAA did not consider development in the 177-acre plot available on the western perimeter of the airport boundary any further.

Improvement and expansion in the 258-acre west-midfield plot is the Proposed Action for Group 1 and represents the CDA's preferred terminal development that includes development on the west side of the airport. This alternative would include improvements to the existing terminal core, including expansion of the existing central terminal core immediately to the west to accommodate terminal facility requirements identified to address Group 1 needs. This alternative would update the existing terminal core, while incorporating an additional international Customs and Border Protection FIS processing facility. The concept would allow for gate flexibility and the accommodation of international gates within the terminal core. Additionally, this alternative would include upgrades to Terminal 5, east of the central terminal core to improve the surface travel connection and reduce roadway congestion.

This alternative meets all screening criteria established in Step 1. This alternative meets Criterion 1 as it would accommodate replacement of infrastructure that has reached the end of its useful life. In addition, the land available for development to the west of the existing central terminal core meets the spatial requirements of Criteria 2, 3, and 4. A 258.3-acre plot (in the west-midfield immediately adjacent to the existing central terminal area; see **Exhibit 3-3**) is available for development immediately adjacent to the existing central terminal core that can accommodate 3,159,310 square feet of terminal facility space within a separate land envelope of approximately 134 acres to accommodate supporting airfield infrastructure, landside access, and passenger connectivity.

This alternative would also address the other requirements of Criteria 2 and 3. It would provide for improvements or new facilities that address existing narrow corridor widths, inadequate passenger amenities, and inadequate baggage circulation. It would also allow for enhanced passenger connections and enable co-location of desired codeshare partners.

Relative to the other alternatives considered, this alternative would minimize facility fragmentation, runway crossing, and replacement of adequate existing infrastructure by adhering to airport planning principles and accomplishing the following:

- Retains the current runway system and configuration and allows for modifications elsewhere on the airfield to maximize operational efficiency,
- Improves passenger handling by enhancing connectivity to the airfield and existing surface transportation access systems, such as the I-90 terminal access corridor, and

- Retains the current location of the existing terminal, which is central to the primary runway(s) to minimize aircraft taxiing distances and active runway crossings, reducing the probability of runway incursions.

Finally, this alternative would address requirements for Criterion 5 as it would accommodate improvements to Terminal 5 roadways. As a result, the FAA determined that this alternative meets the criteria established in Step 1 and retained it for further consideration in Step 2.

In conclusion, for the On-Airport – West Alternatives, the FAA determined that Alternatives 2g and 2h would not meet the purpose and need of the Group 1 projects; therefore, these were not retained in Step 2 of the alternatives screening evaluation for this EA. No further consideration was given to these alternatives. Alternative 2i—where development would occur in the 258.3-acre west midfield plot—was retained for consideration in Step 2.

3.4.1.4 Step 2: Feasibility

For those alternatives that successfully met the Step 1 criteria, the FAA then evaluated them for feasibility under Step 2. Since the FAA determined that Alternative 2i met the criteria under Step 1, Purpose and Need, it was then screened for feasibility.

In Step 2, feasibility was reviewed to ensure that the alternative could be implemented, or be practical, from a technical or economic perspective. There are 18 Group 1 projects in the Proposed Action. Further detail on these projects can be found in **Appendix C,** Section C.3.1**,** as well as **Section 1.5**. The FAA reviewed the CDA's conceptual architectural renderings, plan-level views, demolition plans, and section views that affirm the ability to construct the proposed project, and as a result, determined that the CDA's sponsor-preferred action would meet sound engineering principles and be feasible to construct. The FAA determined that the CDA's Proposed Action satisfied both Step 1 and Step 2 of the screening process, including Criterion 6, and was retained for further consideration in Step 3.

3.4.1.5 Step 3: Avoidance and/or Minimization of Impacts

Finally, Step 3 evaluated the extent to which Alternative 2i would avoid or minimize impacts to special purpose law protected resources. The screening process under Step 3 led to an evolution in the consideration of alternatives as specific design variants of Alternative 2i. The variants focused on various facets of the CDA's initial proposed project, largely connections between new facilities and facilities that are eligible for the National Register of Historic Places (NRHP), to determine if adverse effects could be avoided while meeting the purpose and need.

In total, the CDA evaluated 36 design variants for three building interface locations in response to FAA concerns regarding impacts to historic fabric/features:

- Nineteen variants were reviewed for the interface of Terminal 1 Concourse B with the OGT,
- Nine variants were reviewed for the interface of Terminal 1 Concourse C with Satellite 1, and
- Nine variants were reviewed for the interface of the Rotunda with the OGT.

Figures C-3 and C-4 in **Appendix C** provide a summary of the Step 3 screening results for each design variant considered, including an assessment of requirements under Criteria 7 and 8.[12] As summarized there, only the Proposed Action design variants avoid adverse effects to NRHP resources while also meeting the purpose and need.

[12] Further detail on the assessment process and results can be found in Appendix H and Appendix G.

Those variants are:

- Variant B12d for the OGT connection to Concourse B,
- Variant R-5-1 for the connection of the OGT to the Rotunda, and
- Variant C6a for the connection between Concourse C and Satellite S1.

As a result, the FAA retained these design variants as part of the Proposed Action (Alternative 2i) that was retained for detailed consideration in this EA.

3.4.1.6 Conclusion

The FAA determined that Alternatives 2a through 2h would not meet the purpose and need screening criteria under Step 1; therefore, none of these alternatives advanced to Step 2 of the screening analysis. The FAA determined that Alternative 2i was the only alternative that would meet the purpose and need screening criteria under Step 1.

The FAA and the CDA's consideration of alternatives concluded that most of the development of new land would need to take place in the West-Central area with some elements in the eastern terminal area to achieve the purpose and need for Group 1 projects. The CDA considered a range of West-Central Development Alternatives and their associated variants with some elements in the eastern terminal area but concluded with its initial alternative. The FAA's Alternative 2i met the criteria established for Step 2 – Feasibility.

Under Step 3 of the screening analysis, Alternative 2i was assessed to determine whether its design variants would avoid or minimize impacts to cultural and historic resources protected under special purpose laws. Based on designs of the CDA's Refined Proposed Project, the FAA, in consultation with the State Historic Preservation Officer (SHPO), determined a finding of no adverse effect under the NHPA.[13]

3.4.1.7 No Action Alternative

Under the No Action Alternative, the current facilities at O'Hare would remain unchanged because implementation of the Proposed Action would not occur. The No Action Alternative includes existing space and facilities (as of April 2020) and improvements already approved by the FAA that would be constructed by the Interim year (2025) and Build Out year (2032) considered in this EA. Other projects, as shown on the draft O'Hare Future ALP, have independent need from the Proposed Action and have been or will be processed through separate NEPA review and documentation. See **Appendix C**, Table C-51 for a list of these independent utility projects.

The No Action Alternative does not meet the purpose and need for Group 1 projects and therefore does not meet the criteria for Step 1 of the evaluation process. However, the No Action Alternative was evaluated throughout this EA, in accordance with FAA Order 1050.1F and CEQ guidance.[14]

3.4.2 Group 1 Identification of Alternatives Carried Forward

The results of the alternatives screening analysis for Group 1 are summarized in **Table 3-3**. The No Action Alternative and Alternative 2i, were carried forward for detailed evaluation in the environmental consequences chapter—**Chapter 5** of this EA. Only Alternative 2i meets the purpose and need, but the No

[13] Further detail provided in Section 5.6 Historical, Architectural, Archeological, and Cultural Resources.
[14] 40 CFR Section 1502.14(c)

Action Alternative was also carried forward in accordance with FAA and CEQ requirements. For purposes of this EA, Alternative 2i is hereinafter referred to as the Proposed Action.

TABLE 3-3
SUMMARY OF ALTERNATIVES SCREENING ANALYSIS RESULTS

Category	Alternative	Step 1.1 Does it meet the Group 1 purpose and need?	Step 1.2 Would it make efficient use of existing infrastructure and maximize operational efficiency?	Step 2 Would it meet sound engineering principles and be feasible to construct?	Step 3 Would the alternative minimize and/or avoid environmental impact?	Retained for Detailed Consideration in this EA?	Reason
Other Modes of Travel/ Communication	1a. Conventional and High-Speed Rail Alternative	N	N/A	N/A	N/A	N	This alternative would meet some needs, but not others. It is outside the authority of the FAA and the City and would not be completed in the timeframe of the proposed project. Note that the 2005 EIS examined a quantity of activity that might be siphoned off to these modes or locations. Even with reduced activity, many of the needs at O'Hare would continue but would not be met at off-site alternatives. Therefore, this alternative was not considered further in this EA.
	1b. Highway Travel Alternative	N	N/A	N/A	N/A	N	This alternative would meet some needs, but not others. It is outside the authority of the FAA and the City and would not be completed in the timeframe of the proposed project. Note that the 2005 EIS examined a quantity of activity that might be siphoned off to these modes or locations. Even with reduced activity, many of the needs at O'Hare would continue but would not be met at off-site alternatives. Therefore, this alternative was not considered further in this EA.

Category	Alternative	Step 1.1 Does it meet the Group 1 purpose and need?	Step 1.2 Would it make efficient use of existing infrastructure and maximize operational efficiency?	Step 2 Would it meet sound engineering principles and be feasible to construct?	Step 3 Would the alternative minimize and/or avoid environmental impact?	Retained for Detailed Consideration in this EA?	Reason
	1c. Communications Alternative	N	N/A	N/A	N/A	N	This alternative would meet some needs, but not others. It is outside the authority of the FAA and the City and would not be completed in the timeframe of the proposed project. Note that the 2005 EIS examined a quantity of activity that might be siphoned off to these modes or locations. Even with reduced activity, many of the needs at O'Hare would continue but would not be met at off-site alternatives. Therefore, this alternative was not considered further in this EA.
Use of Other Airports	1d. Use of Local Airports Alternative	N	N/A	N/A	N/A	N	This alternative would meet some needs, but not others. It is outside the authority of the FAA and the City and would not be completed in the timeframe of the proposed project. Note that the 2005 EIS examined a quantity of activity that might be siphoned off to these modes or locations. Even with reduced activity, many of the needs at O'Hare would continue but would not be met at off-site alternatives. Therefore, this alternative was not considered further in this EA.
	1e. Use of Other Mid-Continent Airports Alternative	N	N/A	N/A	N/A	N	This alternative would meet some needs, but not others. It is outside the authority of the FAA and City and would not be completed in the timeframe of the proposed project. Note that the 2005 EIS examined a quantity of

Category	Alternative	Step 1.1 Does it meet the Group 1 purpose and need?	Step 1.2 Would it make efficient use of existing infrastructure and maximize operational efficiency?	Step 2 Would it meet sound engineering principles and be feasible to construct?	Step 3 Would the alternative minimize and/or avoid environmental impact?	Retained for Detailed Consideration in this EA?	Reason
							activity that might be siphoned off to these modes or locations. Even with reduced activity, many of the needs at O'Hare would continue but would not be met at off-site alternatives. Therefore, this alternative was not considered further in this EA.
North	2a. New Terminal Core (North) Development Alternative	N	N/A	N/A	N/A	N	This alternative would not meet the purpose and need as there is not enough contiguous acreage of land available for development of a new terminal core to the north of the airport that would accommodate the terminal facility space requirements to meet Group 1 needs (546-acre land envelope). Additionally, construction of a new terminal core in any of these areas would require the replacement of adequate existing infrastructure, which could not be accommodated elsewhere on the airfield. Therefore, this alternative was not considered further in this EA.
	2b. Improvement and Expansion (North-Central) Development Alternative	N	N/A	N/A	N/A	N	This alternative would not meet the purpose and need as the only land available to accommodate the required 134-acre adjacent or 224-acre non-adjacent expansion of the existing terminal core to the north of the airport would limit gate flexibility and/or require runway crossing for widebody aircraft to safely depart. As a result, this alternative does not meet the requirements for Criterion 4 and does

Category	Alternative	Step 1.1 Does it meet the Group 1 purpose and need?	Step 1.2 Would it make efficient use of existing infrastructure and maximize operational efficiency?	Step 2 Would it meet sound engineering principles and be feasible to construct?	Step 3 Would the alternative minimize and/or avoid environmental impact?	Retained for Detailed Consideration in this EA?	Reason
							not meet the purpose and need. Therefore, this alternative was not considered further in this EA.
South	2c. New Terminal Core (South) Development Alternative	N	N/A	N/A	N/A	N	This alternative would not meet the purpose and need as there is not enough contiguous acreage of land available for development of a new terminal core to the south of the airport that would accommodate the terminal facility space requirements to meet Group 1 needs (546-acre land envelope). Additionally, construction of a new terminal core in any of these areas would require the replacement of adequate existing infrastructure, which could not be accommodated elsewhere on the airfield. Therefore, this alternative was not considered further in this EA.
	2d. Improvement and Expansion (South-Central) Development Alternative	N	N/A	N/A	N/A	N	This alternative would not meet the purpose and need as there is not enough contiguous acreage of land available for development of an expansion to the existing terminal core to the south of the airport that would accommodate the 134-acre adjacent or 224-acre non-adjacent terminal facility space requirements to meet Group 1 needs. Additionally, expansion anywhere to the south of the existing terminal core would require replacement of adequate existing infrastructure, which could not be accommodated elsewhere on the

Category	Alternative	Step 1.1 Does it meet the Group 1 purpose and need?	Step 1.2 Would it make efficient use of existing infrastructure and maximize operational efficiency?	Step 2 Would it meet sound engineering principles and be feasible to construct?	Step 3 Would the alternative minimize and/or avoid environmental impact?	Retained for Detailed Consideration in this EA?	Reason
							airfield. Therefore, this alternative does not meet the purpose and need and was not considered further in this EA.
East	2e. New Terminal Core (East) Development Alternative	N	N/A	N/A	N/A	N	This alternative would not meet the purpose and need as there is not enough contiguous acreage of land available for development of a new terminal core to the east of the airport that would accommodate the terminal facility space requirements to meet Group 1 needs (546-acre land envelope). Additionally, construction of a new terminal core in any of these areas would require the replacement of adequate existing infrastructure, which could not be accommodated elsewhere on the airfield. Therefore, this alternative was not considered further in this EA.
	2f. Improvement and Expansion (East-Central) Development Alternative	N	N	N/A	N/A	N	This alternative would not meet the purpose and need as there is not enough contiguous acreage of land available for development of an expansion to the existing terminal core to the east of the airport that would accommodate the 134-acre adjacent or 224-acre non-adjacent terminal facility space requirements to meet Group 1 needs. Additionally, expansion anywhere to the east of the existing terminal core would require replacement of adequate existing infrastructure, which could not be accommodated elsewhere on the

Category	Alternative	Step 1.1 Does it meet the Group 1 purpose and need?	Step 1.2 Would it make efficient use of existing infrastructure and maximize operational efficiency?	Step 2 Would it meet sound engineering principles and be feasible to construct?	Step 3 Would the alternative minimize and/or avoid environmental impact?	Retained for Detailed Consideration in this EA?	Reason
							airfield. Therefore, this alternative does not meet the purpose and need and was not considered further in this EA.
West	2g. O'Hare Modernization Terminal Concept Alternative	N	N	N/A	N/A	N	This alternative would meet some needs, but not others. The alternative relies heavily on use of existing Terminal 1, 2, and 3 in addition to the new terminal facilities. Only minor upgrades were envisioned to Terminal 2, and none to Terminal 1 or 3. The new facilities would be modern, but corridor widths would not have been expanded nor other improvements made to modernize the existing terminal complex. While new facilities would be developed, the needs associated with the existing facilities would not be addressed. Narrow corridor widths, inadequate passenger amenities, and inadequate baggage circulation would remain. Based upon having three activity centers, airlines would be more distributed and distanced, further inhibiting passenger connections. An FIS addition to Terminal 2 would not enable the co-location of code share partners. Therefore, this alternative was not considered further in this EA.
	2h. New Terminal Core (West) Development Alternative	N	N	N/A	N/A	N	This alternative would not meet the purpose and need as there is not enough contiguous acreage of land available for development of a new terminal core to the west of the airport

Category	Alternative	Step 1.1 Does it meet the Group 1 purpose and need?	Step 1.2 Would it make efficient use of existing infrastructure and maximize operational efficiency?	Step 2 Would it meet sound engineering principles and be feasible to construct?	Step 3 Would the alternative minimize and/or avoid environmental impact?	Retained for Detailed Consideration in this EA?	Reason
							that would accommodate the terminal facility space requirements to meet Group 1 needs (546-acre land envelope). Additionally, construction of a new terminal core in any of these areas would require the replacement of adequate existing infrastructure, which could not be accommodated elsewhere on the airfield. Therefore, this alternative was not considered further in this EA.
	2i. Improvement and Expansion (West-Central) Development Alternative	Y	Y	Y	Y	Y	This alternative would meet the purpose and need, make efficient use of existing infrastructure, and maximize operational efficiency, and is feasible to construct. Additionally, the FAA determined that the CDA's proposed design variants would minimize adverse effects to historic and cultural resources. As a result, it was retained for detailed consideration in this EA.
No Action Alternative		N/A	N/A	N/A	N/A	Y	Although this alternative would not satisfy the purpose and need, it was carried forward as a requirement of 40 Code of Federal Regulations (CFR) Section 1502.14(c). The No Action Alternative serves as a basis for comparing the impacts of all the reasonable alternatives evaluated.

3.5 GROUP 2 ALTERNATIVES CONSIDERED – ON-AIRPORT HOTELS

Group 2 On-Airport Hotels includes the following projects:

- Multimodal Facility (MMF) Hotel, Mixed-Use Development, and Detention Basin Relocation and
- Terminal 5 Hotel Facility and Pedestrian Bridge.

The Group 2 need, as documented in **Chapter 2**, is to increase non-aeronautical revenue.

3.5.1 Identification of Group 2 Alternatives

Based on the preliminary analysis that Group 2 projects are anticipated to have no significant environmental consequences and not involve any resources protected under special purpose environmental laws and regulations, the range of alternatives considered for these projects was the Proposed Action Alternative and the No Action Alternative. Only one action alternative was considered to meet the needs of Group 2.

3.5.2 Group 2 Alternatives Carried Forward

3.5.2.1 Proposed Action

Two on-airport non-aeronautical projects make up the Group 2 Proposed Action. They are further detailed in **Appendix C**, Section C.3.2.

3.5.2.2 No Action

Under the No Action Alternative, the current facilities at O'Hare would remain unchanged because implementation of the Proposed Action would not occur.

The No Action Alternative was carried forward as a requirement of 40 CFR Section 1502.14(c). The No Action Alternative serves as a basis for comparing the impacts of all reasonable alternatives evaluated.

3.6 GROUP 3 ALTERNATIVES CONSIDERED – AIRFIELD AND TAXIWAY IMPROVEMENTS NOT REQUIRED BY THE TERMINAL PROJECTS

Group 3 Airfield and Taxiway Improvements Not Required by the Terminal Projects includes the following:

- Bravo Hold Pad Conversion,
- Runway 28R Blast Pad Expansion,
- Runway 9L/27R Exit Taxiways,
- Taxiways P, V, and Y Reconfiguration,
- Taxiway T Demolition, and
- Taxiway DD Realignment at the Taxiways Q Intersection.

The Group 3 needs, as documented in **Chapter 2,** are to:

- Provide additional temporary aircraft parking positions,
- Expand Runway 28R Blast Pad to meet FAA standards, and
- Improve efficiency and reduce aircraft occupancy time on Runway 9L/27R.

3.6.1 Identification of Group 3 Alternatives

Based on the preliminary analysis that Group 3 projects are anticipated to have no significant environmental consequences or involve a resource protected under special purpose environmental laws and regulations, the range of alternatives considered for these projects was the Proposed Action Alternative and the No Action Alternative. Only one action alternative was considered to meet the needs of Group 3.

3.6.2 Group 3 Alternatives Carried Forward

3.6.2.1 Proposed Action

Six airfield and taxiway projects make up the Group 3 Proposed Action. They are further detailed in **Appendix C**, Section C.3.3.

3.6.2.2 No Action

Under the No Action Alternative, the current facilities at O'Hare would remain unchanged because implementation of the Proposed Action would not occur.

The No Action Alternative was carried forward as a requirement of 40 CFR Section 1502.14(c). The No Action Alternative serves as a basis for comparing the impacts of all reasonable alternatives evaluated.

3.7 GROUP 4 ALTERNATIVES CONSIDERED – SUPPORT FACILITIES NOT REQUIRED BY THE TERMINAL PROJECTS

Group 4 Support Facilities Not Required by the Terminal Projects includes the following:

- West Heating and Refrigeration Facility,
- West Employee Screening Facility,
- West Employee Ground Transportation Facility and Parking Garage,
- West Employee Landside Access,
- West Landside Detention Basins,
- Airside Service Roadways,
- Aircraft Rescue and Firefighting Station 4 Relocation,
- Commercial Vehicle Holding Area Expansion, and
- Centralized Distribution and Receiving Facility.

The Group 4 needs, as documented in **Chapter 2**, are summarized as:

- Provide additional airline employee parking and
- Safely and efficiently process goods currently being brought into the terminal core.

3.7.1 Identification of Group 4 Alternatives

Based on the preliminary analysis that Group 4 projects are anticipated to have no significant environmental consequences or involve any resources protected under special purpose environmental laws and regulations, the range of alternatives considered for these projects was binary: the Proposed Action Alternative and the No Action Alternative. Only one action alternative was considered to meet the needs of Group 4.

3.7.2 Group 4 Alternatives Carried Forward

3.7.2.1 Proposed Action

Nine support facility projects make up the Group 4 Proposed Action. They are further detailed in **Appendix C**, Section C.3.4.

3.7.2.2 No Action

Under the No Action Alternative, the current facilities at O'Hare would remain unchanged because implementation of the Proposed Action would not occur.

The No Action Alternative was carried forward as a requirement of 40 CFR Section 1502.14(c). The No Action Alternative serves as a basis for comparing the impacts of all reasonable alternatives evaluated.

3.8 GROUP 5 ALTERNATIVES CONSIDERED – AIR TRAFFIC ACTIONS FOR OFFSET APPROACH PROCEDURES FOR RUNWAY 10R/28L

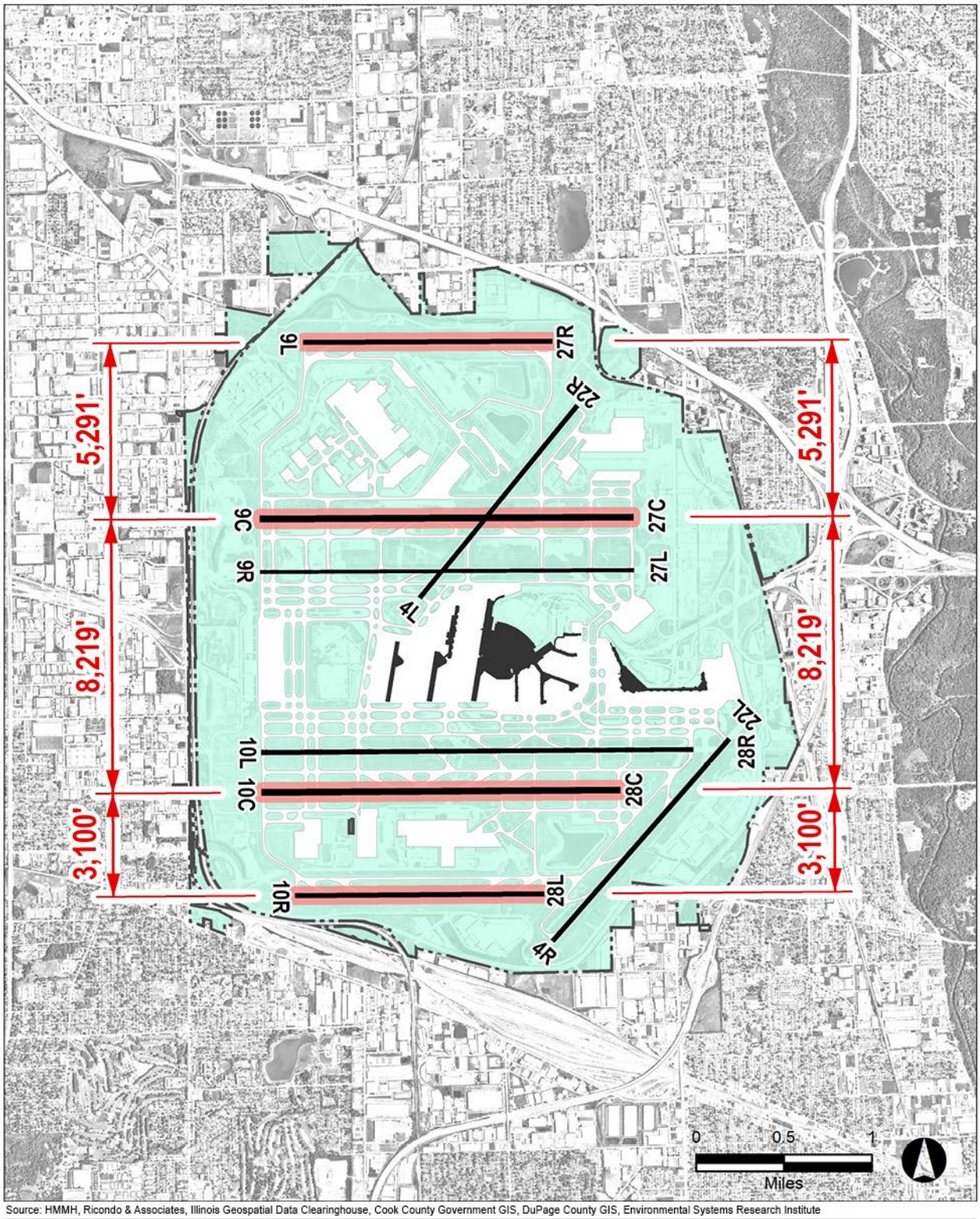
The proposed Group 5 air traffic actions include retaining offset (angled) approaches to Runway 10R/ 28L. Multiple alternatives were considered to meet the need of Group 5. Additional background is provided in **Appendix C**, Section C.2.5.

In 2015, FAA implemented temporary, independent simultaneous offset (angled) air traffic approach procedures to Runway 10R/28L for greater throughput and reduced delays. With only 3,100 feet separation between Runway 10R/28L and its adjacent parallel runway (Runway 10C/28C), the final approach courses to the southernmost parallel runway (Runway 10R/28L) needed to be offset from their extended centerlines to enable independent simultaneous approaches to Runways 10R and 10C and to Runways 28L and 28C (see **Exhibit 3-4**). These offset air traffic approaches to Runway 10R/28L were modeled, and the effects were previously disclosed as part of a temporary approval documented in the 2015 Written Re-Evaluation of the OMP EIS.

As a result, this section evaluates alternatives to retention of the offset air traffic approaches to Runway 10R/28L.

3.8.1 Identification of Group 5 Alternatives

This section describes the FAA's comprehensive approach to identifying alternatives to Group 5 project components. To achieve the design capability of the airfield, the FAA desired to put in place offset air traffic approaches to Runway 10R/28L. The offset air traffic approaches enable simultaneous parallel approaches to the four parallel runways used primarily for arrivals—the design objective of the airfield approved in the 2005 EIS. To meet both O'Hare's design operating capability and FAA safety guidance, alternative ways of achieving simultaneous parallel approaches to four parallel runways were identified.



Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

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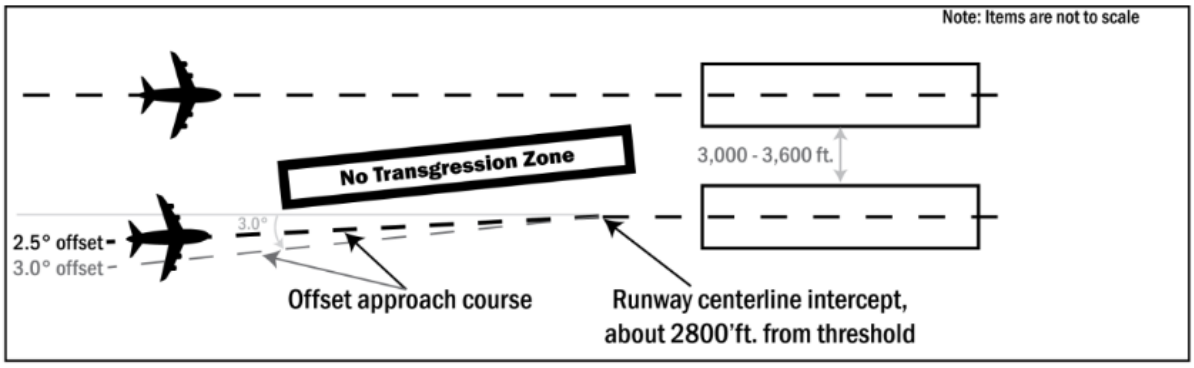
Main Arrival Runways and Separation Distances

▶ Exhibit 3-4

3.8.1.1 Range of Group 5 Alternatives Considered

Simultaneous independent approaches to closely spaced parallel runways (those defined by FAA guidance as spaced 3,000 and 3,600 feet apart) require that one of the approach courses be offset from the extended centerline (see **Figure 3-3**). To ensure safety, the allowable offset air traffic approach angle design standard ranges from 2.5 to 3 degrees. This is because an offset angle of less than 2.5 degrees would not achieve the necessary separation required for independence from aircraft on other runways, resulting in dependency on the adjacent arrival stream. On the other hand, an offset angle greater than 3 degrees is unallowable because it would place aircraft on approach too close to one another, increasing the risk of incursion into the no-transgression zone[15] between the parallel runways by the aircraft on the offset air traffic approach. **Figure 3-3** illustrates a notional offset east flow approach; the west flow approach is a mirror image of this graphic.

FIGURE 3-3
SIMULTANEOUS INDEPENDENT APPROACHES TO CLOSELY SPACED PARALLEL RUNWAYS



Simultaneous Independent Approaches to Closely Spaced Parallel Runways

- Runway centerlines spaced at 3,000 to 3,600 feet apart
- "Independent" requires that one of the approach courses be offset from extended centerline by 2.5 to 3 degrees

Source: HMMH 2021; Graphic derived from Information contained in FAA JO 7110.65X, USTERPS (FAAO 8260.3E), and FAA JO 7110.308C

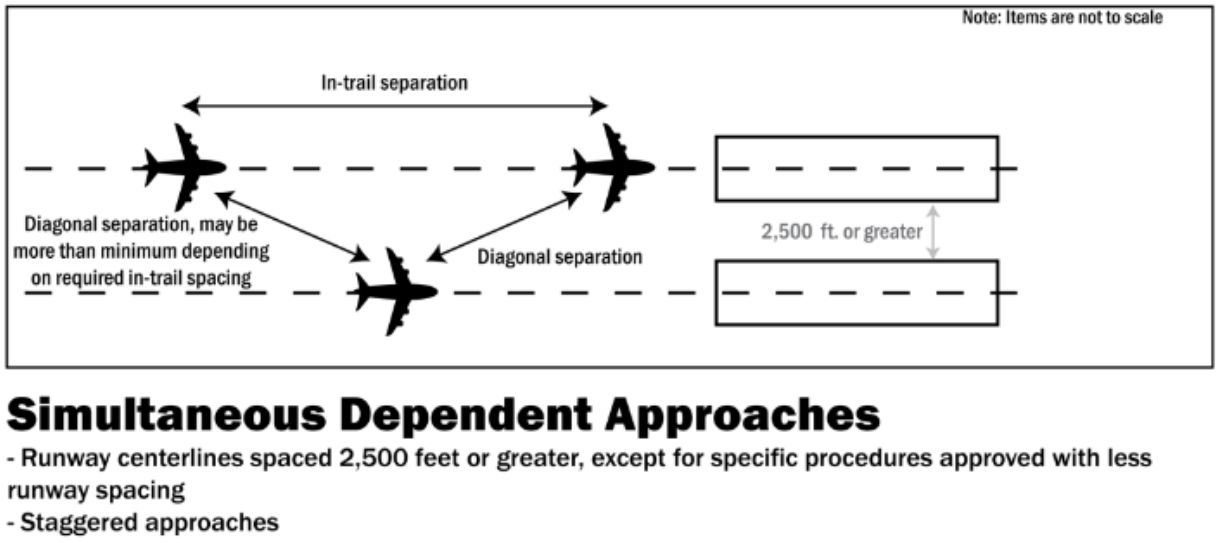
The existing temporarily approved offset air traffic approach procedures allow for simultaneous approaches to three runways in east or west flows, with one of the three runways being Runway 10R/28L. For example, in east flow, the offset air traffic approach procedures allow for simultaneous approaches to Runways 10R, 10C, and 9L. In west flow, offset air traffic approach procedures allow for simultaneous approaches to Runways 28L, 28C, and 27R. The 2.5 degree offset final approach paths to Runway 10R/28L were temporarily approved in October 2015 in the Written Re-Evaluation of the OMP EIS. The offset air traffic approach paths increase separation between aircraft on parallel approaches involving Runway 10R/28L.

[15] FAA JO 7110.65Y defines the no-transgression zone as a 2,000-foot-wide zone located equidistant between parallel runway approach courses in which flight is normally not allowed.

Based on the considerations above, the following Group 5 alternatives were considered:

- **2.5 Degree Offset Alternative.** The offset angle of 2.5 degree represents the smallest degree of offset from the runway heading that enables independent, parallel approaches.
- **3.0 Degree Offset Alternative.** The offset angle of 3 degree represents the largest degree of offset from the runway heading that enables independent, parallel approaches without increasing the risk of incursion into the no-transgression zone between the parallel runways by the aircraft on the offset air traffic approach.
- **No Action Alternative.** The 2015 Written Re-Evaluation assumed the offset air traffic approaches would expire when Build Out of the O'Hare Modernization occurred, currently assumed to occur at the end of 2022. Therefore, the No Action Alternative does not include the offset air traffic approaches and the associated offset downwind approach procedures, relying instead on approaches aligned with the extended runway centerlines. **Figure 3-4** provides a depiction of simultaneous dependent approaches. In essence, the No Action would result in not achieving the airfield design objective of independent parallel runway approaches.

FIGURE 3-4
SIMULTANEOUS DEPENDENT APPROACHES



Source: HMMH 2021; Graphic derived from Information contained in FAA JO 7110.65X, USTERPS (FAAO 8260.3E), and FAA JO 7110.308C

3.8.2 Group 5 Projects Screening Process Overview

As described in **Appendix C**, Section C.1.2, the alternatives evaluation for this EA generally followed a systematic three-step screening process illustrated in **Figure 3-1**. The process was modified to accommodate the project types included in each group. The first screening step addressed whether the alternatives would satisfy the purpose and need for Group 5, as described in more detail in **Chapter 2**. Under Step 2, Group 5 alternatives were screened to ensure that they meet feasibility considerations. Alternatives that did not meet the criteria established at Step 2 were eliminated from further consideration and did not move on to Step 3. Finally, Step 3 evaluated the extent to which the alternative would avoid or minimize impacts to resources protected under special purpose environmental laws and regulations.

Alternatives that were not retained through the screening process were dismissed from further review; dismissed alternatives were not subject to a detailed analysis of environmental consequences. The criteria considered in each screening step are defined in **Table 3-4**.

TABLE 3-4
ALTERNATIVES SCREENING PROCESS CRITERIA

Step	Criteria	Criterion Requirements
1 – Purpose and Need	Would the alternative address the need to align FAA Air Traffic Control procedures with the design operating capability of the airfield runway complex?	The alternative must provide the capability for independent parallel approaches to parallel runways using the southernmost runway, increase flexibility and efficiency, and reflect the existing airfield design operating capability of O'Hare.
2 – Feasibility	Would the alternative be feasible to operate based on existing FAA guidance?	The alternative must be feasible to operate based on existing FAA air traffic management guidance and procedure design criteria.
3 – Minimization	Would the alternative minimize and/or avoid impacts to resources protected under special purpose laws and regulations?	The alternative should minimize and/or avoid impacts to special purpose resource categories.

3.8.3 Group 5 Projects Alternatives Evaluation

Due to the complexity of O'Hare's airspace and operations, the FAA used the results of Total Airspace and Airport Modeler (TAAM) computer simulations (or models) to determine whether each alternative could meet the Step 1 – Purpose and Need criteria by addressing the need to align FAA Air Traffic Control procedures with the design operating capability of the airfield runway complex. Further detail is available in **Appendix C**, Section C.2.5.3 and **Chapter 4**.

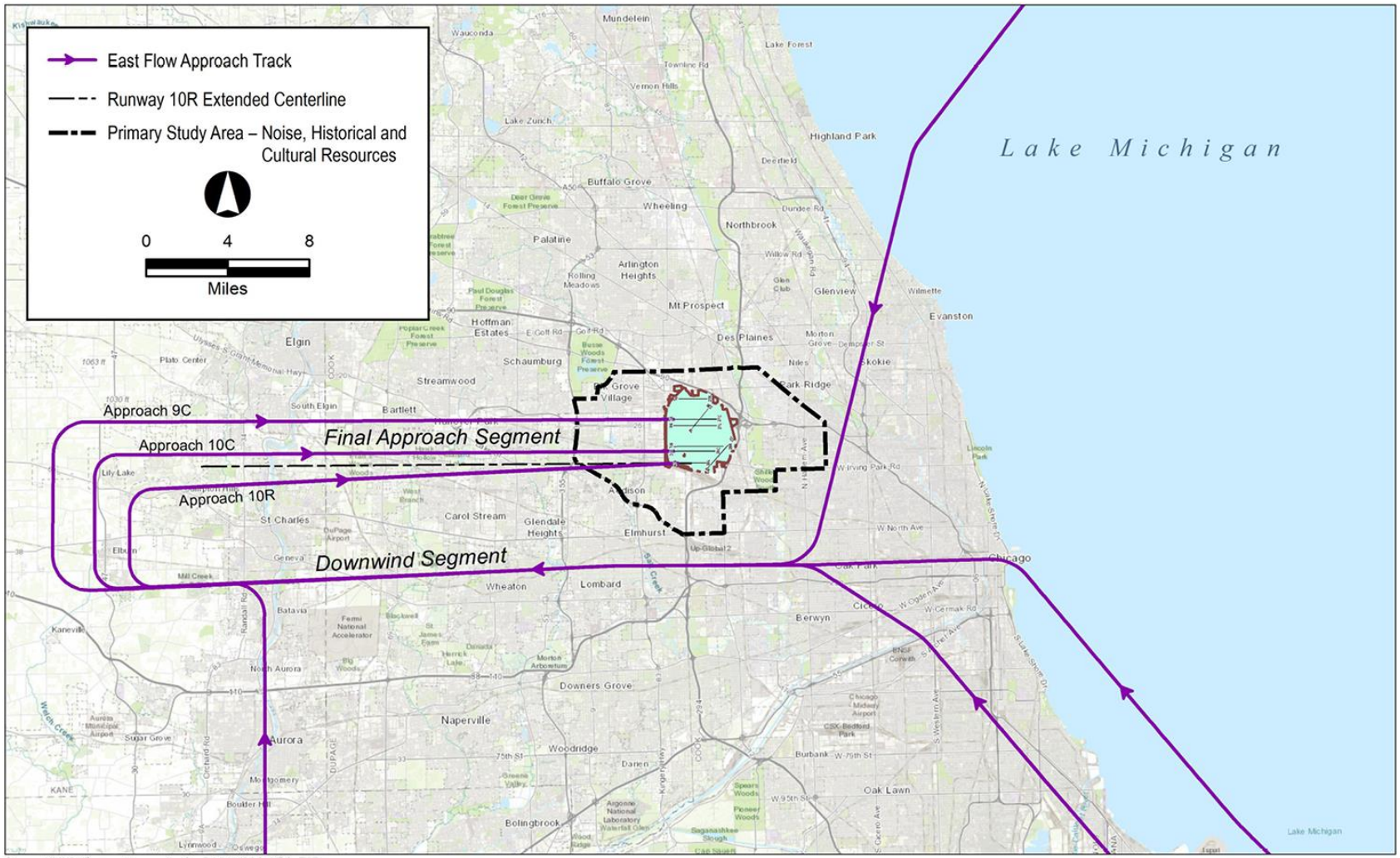
Exhibits 3-5 and **3-6** show the approaches for the 2.5 degree offset, for east and west flows, respectively. As noted above, for runway centerlines spaced between 3,000 and 3,600 feet apart, the allowable offset air traffic approach angle design standard ranges from 2.5 to 3 degrees.

The results of the TAAM modeling showed that the annual average air and ground delay for arrivals in east flow Instrument Flight Rules (IFR) conditions for the Build Out Proposed Action (with the 10R offset) would be 5.5 minutes compared to 19.4 minutes for the Build Out No Action (no offset) scenario. This results in a 72 percent reduction in average arrival delays with implementation of the 10R offset for arrivals in IFR conditions. In west flow IFR, TAAM modeling showed the average annual air and ground delay for arrivals for the Build Out Proposed Action (with the 28L offset) would be 6.9 minutes, compared to 13.4 minutes for the No Action (no offset) scenario. This results in a 49 percent reduction in average arrival delays with implementation of the 28L offset for arrivals in IFR conditions (see **Table 3-5**).

TABLE 3-5
TAAM ARRIVAL DELAY AVERAGES FOR PROPOSED ACTION AND NO ACTION (OFFSET) FOR IFR CONFIGURATIONS

Configuration	Average Air and Ground Delay for Arrivals (minutes) Proposed Action (With Offsets)	Average Air and Ground Delay for Arrivals (minutes) No Action (No Offsets)	% Reduction in Average Arrival Delay with Offset
IFR west	6.9	13.4	49%
IFR east	5.5	19.4	72%

Source: CDA, 2020, TAP EA Simulation Data Package, Table 2-9



Source: HMMH, DeLorme, Intermap, GeoBase, USGS, NPS, ESRI

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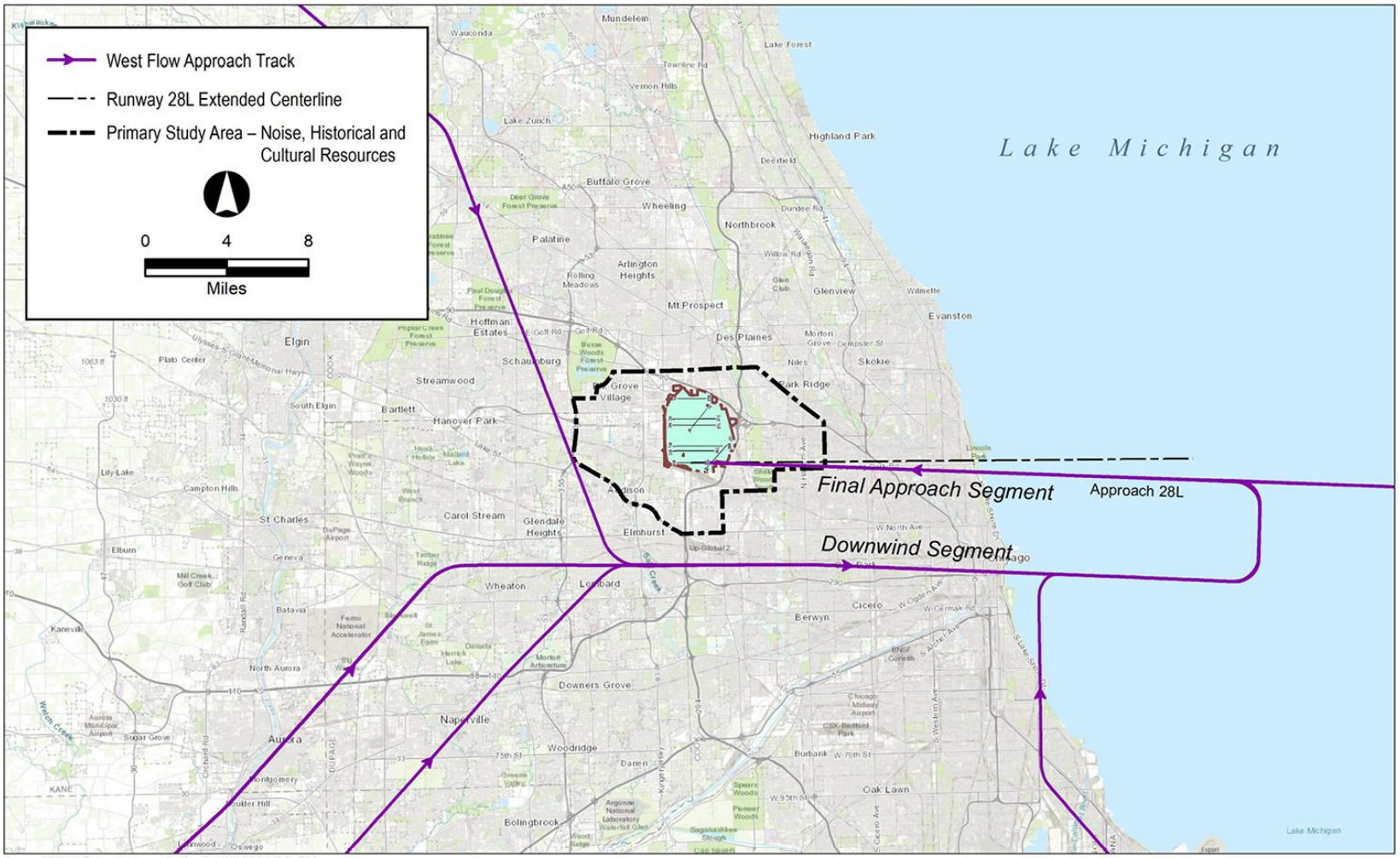
2.5 Degree Offset Approaches for East Flow

▶ Exhibit 3-5



Source: HMMH, DeLorme, Intermap, GeoBase, USGS, NPS, ESRI

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2.5 Degree Offset Approaches for West Flow

Exhibit 3-6

The FAA determined that both the 2.5 degree offset alternative and 3 degree offset alternative meet the Step 1 – Purpose and Need criterion as they increase flexibility and efficiency of O'Hare's airspace.

The FAA determined that both the 2.5 degree and 3 degree offset alternatives are feasible based on existing FAA guidance because the 2.5 degree offset is currently in operation at O'Hare. Therefore, they would meet Step 2 criteria, and both were advanced to Step 3.

In Step 3, when assessing minimization or avoidance of impacts to special purpose law protected resources, The FAA determined that the 3 degree offset alternative would not provide any additional operational benefit over the 2.5 degree offset but that its implementation may increase the likelihood of effects from aircraft noise when compared to the 2.5 degree offset. In addition, the 2.5 degree offset is preferred because, unless other constraints such as terrain or tall structures exist, the smallest degree of offset is always preferred for pilot familiarity with standardized, stabilized approach techniques. Due to the nature of air traffic actions, they are unlikely to have an impact on some special purpose law protected resources, like wetlands, floodplains, and waterways. However, some special purpose law protected resources such as Section 4(f) resources (parks, recreational areas, wildlife and waterfowl refuges, and historic sites) may be impacted from air traffic actions that induce a change in noise exposure. As a result, the primary consideration for this comparative analysis in terms of potential impact to special purpose law protected resources is aircraft noise.

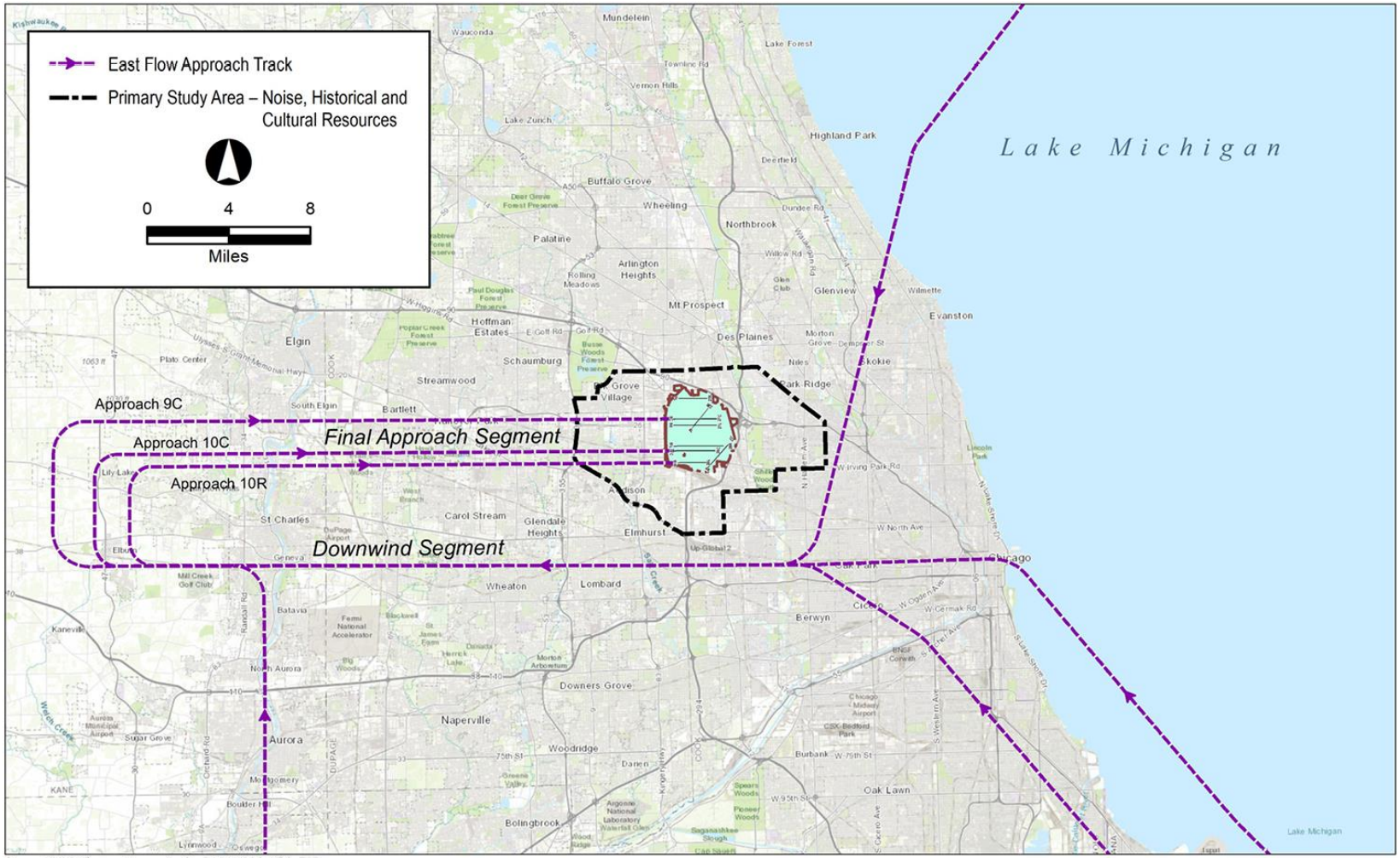
The FAA determined that a greater offset (i.e., a 3 degree offset versus a 2.5 degree offset) from the runway centerline (the No Action Alternative) would result in an increased displacement from the extended runway centerline at any given point along the approach course (compared with the No Action Alternative). Consequently, the 2.5 degree offset alternative was retained as the alternative carried forward for detailed analysis in this EA, and the 3 degree offset alternative was not retained for further consideration.

In conclusion, the FAA determined that both the 2.5 degree offset alternative and 3 degree offset alternative met the purpose and need screening criteria (Step 1) and feasibility screening criteria (Step 2) and were advanced to Step 3 of the screening analysis. During that final step, the FAA determined that the 3 degree offset alternative would not avoid or minimize environmental impact as the likelihood of environmental impact increases as the offset from centerline increases. Therefore, the 2.5 degree offset alternative, which provides the smallest degree of offset from the runway heading that enables independent, parallel approaches, was selected as the alternative that would best avoid or minimize environmental impact and it was carried forward for detailed analysis in this EA.

3.8.3.1 No Action

Under the No Action Alternative, the current 2.5 degree offset final approach courses to Runway 10R/28L at O'Hare would become extended runway centerline because implementation of the Proposed Action would not occur.

Exhibits 3-7 and **3-8** show the approaches for the No Action Alternative, for east and west flows, respectively. Independent simultaneous approaches to three runways in east or west flows, with one of the three runways being Runway 10R/28L, would not be feasible and the dependent simultaneous approaches would be less efficient.



Source: HMMH, DeLorme, Intermap, GeoBase, USGS, NPS, ESRI

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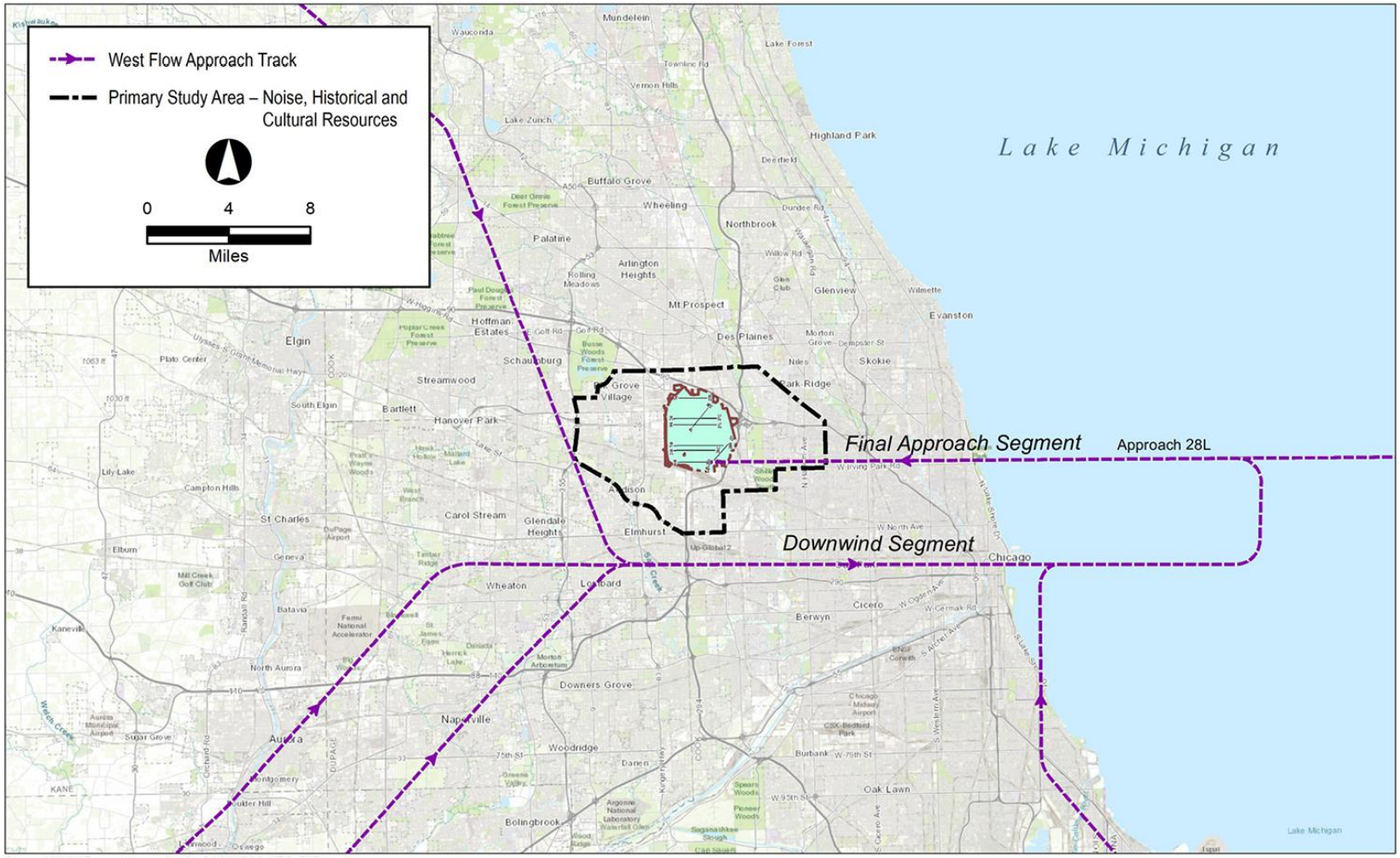
Approaches Without Offset for East Flow

Exhibit 3-7



Source: HMMH, DeLorme, Intermap, GeoBase, USGS, NPS, ESRI

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Approaches Without Offset for West Flow

Exhibit 3-8

As a result, the FAA determined that the No Action Alternative could not meet the need to retain operational efficiency and prevent additional delay because the straight-in dependent simultaneous approaches would increase delay, and therefore would not meet the Step 1 Purpose and Need screening criteria. No further evaluation of the No Action Alternative was conducted during this alternatives screening process.

The No Action Alternative does not meet the purpose and need for Group 5 projects. However, in accordance with NEPA requirements, the No Action Alternative was retained for evaluation throughout this alternatives screening process and environmental consequences assessment in this EA for comparison against any other alternative that passed the screening criteria.

3.8.3.2 Group 5 Identification of Alternatives Carried Forward

The results of the alternatives screening analysis for Group 5 are summarized in **Table 3-6**. The 2.5 degree offset alternative and No Action Alternative were carried forward for detailed evaluation in the environmental consequences chapter, **Chapter 5**, of this EA. Only the 2.5 degree offset alternative meets the purpose and need, but the No Action Alternative was also carried forward in accordance with FAA and CEQ requirements.

TABLE 3-6
SUMMARY OF ALTERNATIVES SCREENING ANALYSIS RESULTS

Alternative	Step 1 Does it meet the Group 5 purpose and need?	Step 2 Would the alternative be feasible to operate based on existing FAA guidance?	Step 3 Would the alternative minimize and/or avoid environmental impact?	Retained for Detailed Consideration in this EA?	Rationale
2.5 Degree Offset	Y	Y	Y	Y	This alternative could meet the need for increased operating capability. Offset arrival procedures for Runway 10R/28L would allow for increased operating flexibility.
3 Degree Offset	Y	Y	N	N	This alternative would meet the Group 5 need however the likelihood of environmental impact increases as the offset from centerline increases, therefore 2.5 degree is preferred as compared to 3 degree. Therefore, this alternative was not considered further in this EA.
No Action Alternative	N	N/A	N/A	Y	Although this alternative would not satisfy the purpose and need, it was carried forward as a requirement of 40 CFR Section 1502.14(c). The No Action Alternative serves as a basis for comparing the impacts of all the reasonable alternatives evaluated.

3.9 SUMMARY OF ALTERNATIVES RETAINED FOR DETAILED CONSIDERATION

3.9.1 Description of Proposed Action Alternative

This section provides a summary of the Proposed Action, which is comprised of the alternatives retained for detailed consideration under each group. A detailed description of the projects included in the Proposed Action is located in **Chapter 1** and **Appendix C**, Section C.3. The CDA Recommended Proposed Action Alternative includes 35 projects which are summarized in **Table 3-7**. They are organized into five groups. The proposed resultant footprint area is a summary of the facility and pavement/ roadways footprints within each project group, as listed in **Chapter 1**. The high-level schedule reflects the range of years when the projects within each group would be constructed.

TABLE 3-7
SUMMARY OF PROPOSED ACTION ALTERNATIVE

EA Project Group	Number of Projects	Proposed Resultant Footprint Area (sq ft. unless otherwise specified)	High level schedule
Group 1: Terminal Projects	18	1,609,000 sq. ft. of Facilities 9,294,000 sq. ft. of Apron/Taxiway Pavement 543,000 sq. ft. of New/Reconfigured Roadway and Parking Pavement	2023–2032
Group 2: On-Airport Hotels	2	262,000 sq. ft. of Hotels and Associated Development	2024–2026
Group 3: Airfield and Taxiway Improvements Not Required by the Terminal Projects	6	2,938,000 sq. ft. of New/Reconfigured Airfield/ Taxiway Pavement	2026–2032
Group 4: Support Facilities Not Required by the Terminal Projects	9	1,309,000 sq. ft. of Facilities 445,000 sq. ft. of stormwater detention basins 2,035,000 sq. ft. of Roadways/Pavement	2023–2032
Group 5: Air Traffic Actions for Offset Approach Procedures for Runway 10R/28L	N/A	N/A	After FAA issuance of decision document, if approved. The offset air traffic approach procedures temporarily approved in 2015 would become permanent.

Source: CDA. TAP and Future ALP Projects. Project Descriptions. February 18, 2022.

3.9.2 Description of No Action Alternative

The No Action Alternative is defined as maintaining the existing O'Hare facilities with improvements that have already been planned and approved by the FAA, and for which the NEPA process has been completed. The No Action Alternative was included in this EA as required, although it does not address the purpose and need of the project. By maintaining most or all the existing terminal core, terminal facilities would continue to not meet modern passenger needs. They would not integrate domestic and international airline and airline partner screening and operations. They would continue to not provide sufficient gate

frontage, gate flexibility, and taxiway connections necessary to efficiently accommodate existing and future airline fleets. Additionally, ground access to Terminal 5 would remain insufficient.

The list of projects contained in the No Action Alternative is provided in **Appendix C**, Section C.4.